CNC TURRET PUNCH PRESS

EM NT SERIES ⓤⓢ

EMZ-3510NT/3610NT
EMK-3510NT/3610NT
(AMNC-F)

OPERATOR'S MANUAL

ᗅMADA®

PREFACE   Read this manual carefully to obtain a thorough knowledge of the machine and its installation, operation, and maintenance.   Correctly operate the machine as described in the manual to prevent personal injuries and machine damage. Do not operate the machine by guesswork.   Keep the manual at hand and refer to it whenever you are not sure of how to perform any of the procedures.

This manual classifies the hazardous situations into the following levels:

DANGER   **Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**

WARNING   **Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**

CAUTION   **Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.**

NOTICE   **Indicates a potentially hazardous situation which, if not avoided, may result in damage to the machine and tooling.**

NOTE   **Indicates not a warning but an item of information which should be known to work.**

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AMADA

Safety Rules
&
Safety Functions

SAFETY RULES

Observe these safety rules to prevent injuries and accidents.

a) Install protective devices (such as a light curtain) around the machine.

b) Have the machine operated by a single, trained person who has read this manual and acquired a thorough knowledge of the machine and its operation.   If more than one authorized operator must be involved, coordinate their work to ensure utmost safety.

c) Do not wear loose clothing, a necktie, or a muffler when operating the machine.   They can be extremely dangerous if any part of them is caught in the machine.

d) Observe the following punching precautions.   If you are not sure of whether or not a particular worksheet can be punched, consult the AMADA engineer.

- Do not punch worksheets that exceed the nominal press capacity of the machine.
- Do not punch worksheets that exceed the maximum allowable thickness.
- Do not punch worksheets of glass, stone, or any other material that may scatter when punched.
- Do not punch worksheets of wood, plaster, and any other material that generate powder or crumble when punched.
- Do not punch worksheets that exceed the tool usage conditions and punching conditions.

e) Turn the SAFETY DEVICE keyswitch to SETTING, remove the key from the switch, and keep it by yourself when working inside the hazardous area around the machine.

f) Clear the hazardous area around the machine of people and obstacles before starting the machine.   Do not overlook the area behind the machine.

g) Do not leave the keys in the machine's keyswitches.   Leave the keys in the custody of the supervisor when they are not in use.

h) Turn off the power and shut down the compressed air supply when carrying out a maintenance operation.   Then padlock the machine circuit breaker switch lever.   If the power is needed, prevent the machine from being started by mistake.   Turn the SAFETY DEVICE keyswitch to SETTING, remove the key from the switch, and keep it by yourself.

i) Inspect the machine before starting the day's work and as frequently and regularly as possible.   Carry out the periodical maintenance operations to ensure trouble-free machine operations.

j) Never modify the machine's parts or electric circuits or change them for unauthorized parts or circuits.   Doing so will cause machine malfunction and damage and disrupt the safety of the machine and the operator.

k) The machine is controlled by a personal computer-based NC unit.   Any software or hardware changes may cause the machine to misoperate and lead to a serious accident.
Strictly observe the following rules:

- Do not add or change any hardware (e.g., memory, SCSI card, PC card, CF card).
- Do not remove or insert boards like the CPU board.
- Do not install or uninstall software.
- Do not change, add, delete, or move Windows files and folders.
- Do not operate on the Windows system files (e.g., control panel and registry file).

- At the startup and shutdown of the NC unit, the following display appears on the screen.   Do not touch the screen.
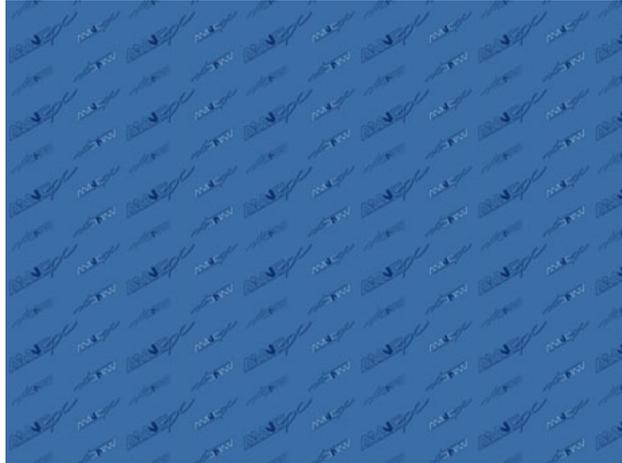
- Do not save files other than punching programs in the NC unit through a CD-ROM or a floppy disk, or through another computer connected to the AMNC system.
- To prevent infection with computer viruses, do not use floppy disks and other media that contain files and programs of unknown origin.

l)   Do not allow anyone with a heart pacemaker or other medical device to approach the machine.   Such medical devices may malfunction or fail around the machine.

DANGER and WARNING plates

Keep the DANGER and WARNING plates well noticeable and never remove them.

WARNING

TO PREVENT SERIOUS BODY INJURY

NEVER USE THIS MACHINE WITHOUT GUARDS OR SAFETY DEVICES THAT ARE INTENDED TO PREVENT HANDS FROM REMAINING IN DIE SPACE.

NEVER OPERATE, SERVICE OR ADJUST THIS MACHINE, OR INSTALL DIES, WITHOUT PROPER INSTRUCTION AND WITHOUT FIRST READING AND UNDERSTANDING THE INSTRUCTIONS IN THE OPERATORS OR MACHINE MANUAL.

NEVER INSTALL PUNCHES & DIES WITHOUT OPENING TOOL CHANGE GUARD OR WHILE NOT IN PROPER TOOL CHANGE POSITION.

WORK SAFELY AT ALL TIMES

DO NOT REMOVE THIS SIGN FROM THIS MACHINE

警 告

为 了 防 止 人 身 意 外

禁 止 在没有正确的安全装置的情况下使用机床，以防止手被夹在模具里发生意外。

禁 止 在没有正确的指导以及仔细阅读、理解机床操作手册的情况下，使用、维修或调整机床以及安装冲模。

禁 止 在没有打开模具更换防护装置并在合适的更换位置上安装上、下模具。

请时刻注意工作安全

WARNING

1. CHECK and CLEAR AREA. around machine BEFORE OPERATION.
2. Press STOP BUTTON when working on or around machine.
3. Turn TOOL CHANGE SWITCH to ON before opening TOOL CHANGE DOOR.

警 告

1. 操作台周围如果有人在，有可能被夹在操作台与机器中间，非常危险。所以，必须确认操作台周围没有人时，才能开动机器。
2. 调换模具或产品取放时，必须将开关接在工具交换开关一侧，或按下（STOP）停止钮。
3. 操作机器必须遵循单独操作的原则。
4. 机器保养时，必须切断主电源。

DANGER / **危险**

加工中，请勿进入台面移动范围内。

警 告 / **WARNING**

台面移动时最前端位置。 / Table travel end limit.

警 告 / **WARNING**

请勿将手放在这里、有可能夹手。 / Do not put hands here while moving.

AMADA

EMZ 3510 NT

Hazard seriousness level

⚠ **DANGER** — **Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**

⚠ **WARNING** — **Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**

⚠ **CAUTION** — **Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.**

警告水平

⚠ **危险** — 显示若不回避该危险时，将会引起死亡或遭受严重障碍的紧迫的潜在危险状况。

⚠ **警告** — 显示若不回避该危险时，可能会引起死亡或遭受严重障碍的潜在危险。

⚠ **注意** — 显示若不回避该危险时，可能会遭受中度或轻度障碍的潜在危险。

SAFETY FUNCTIONS

The following functions ensure the safe operations of the machine:

Operator safety

- Hazard detection:

  The machine stops if one of the light beams of the light curtain is interrupted.

- Tool-change protection:

  A switch is installed to lock the carriage and carriage base during a tool change.

Machine safety

- Servo-system protection:

  The machine stops if an irregularity is detected in the servo-system, such as an overloaded servomotor.

- Stripping failure detection:

  The machine stops if the worksheet is not stripped off the punch or if stripping is delayed.

- Workclamp/Workholder protection:

  The machine stops temporarily if a workclamp enters an area in which it may interfere with the punch.   The machine also stops temporarily if there is a danger of workclamp-and-workholder collision during a worksheet repositioning.   The workclamps can be opened only when the machine is stopped.

- Overtravel detection:

  The machine stops if the carriage or carriage base overtravels.

- Overtravel precheck:

  An alarm is caused if any program data which will make the carriage or carriage base overtravel are detected.   The detection is made automatically by the NC unit in the MEMORY mode prior to program execution.

- Turret index pin & striker position detection:

  Punching will not be performed if a turret index pin is not inserted or if the striker is not positioned over the proper turret track.

- X-gauge block protection:

  The machine does not start if the X-gauge block is not lowered.   The machine stops if the X-gauge block is raised erroneously during operation.

- Air pressure detection:

  The machine stops if the operating air pressure has been reduced below the required pressure.

- Hit rate regulation:

  The protection of the drive motor automatically regulates the timing of punching to prevent the temperature of the drive motor from rising.   When the hit rate is regulated, "Under hit rate regulation" is displayed in the guide area.   If this regulation extremely prolongs the punching time, check the TOOLING DATA display to see that the circumferential length is appropriately set.

General Information

IDENTIFICATION OF MACHINE PARTS
FRONT VIEW

TOOL BALANCER

TOOL BALANCER CONTROLS

SUBCONTROL PANEL" B"

Amada

EMZ 3510NT

SUBCONTROL PANEL" A"

AIR PRESSURE CONTROL UNIT

TURRET JOG ON BUTTON

SIDE VIEW

MIRROR

TOP VIEW

AMPBOX

ELECTRICAL
CONTROL
CABINET

CARRIAGE BASE

CARRIAGE

WORKCLAMP

TABLE

MAIN CONTROL PANEL
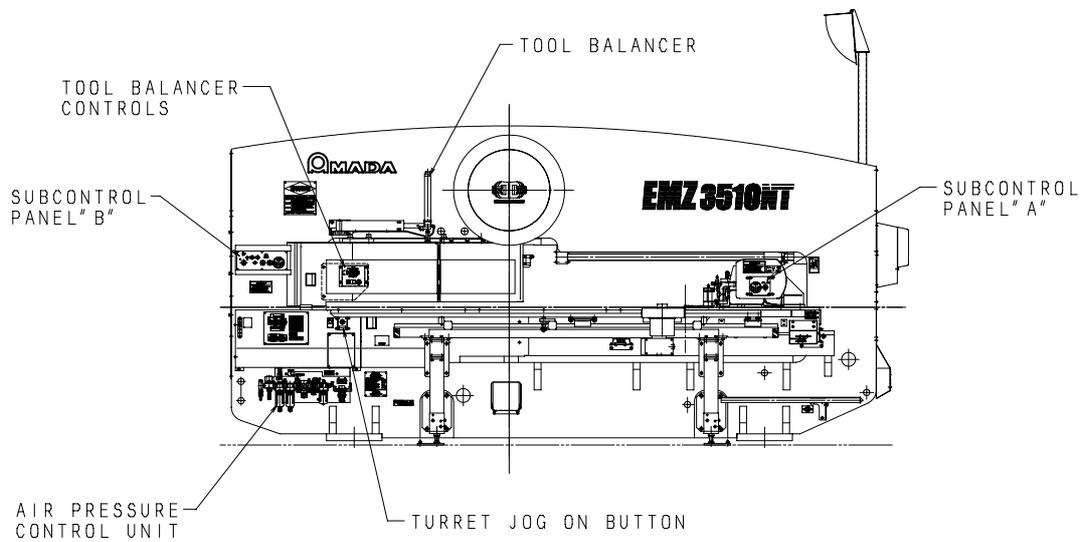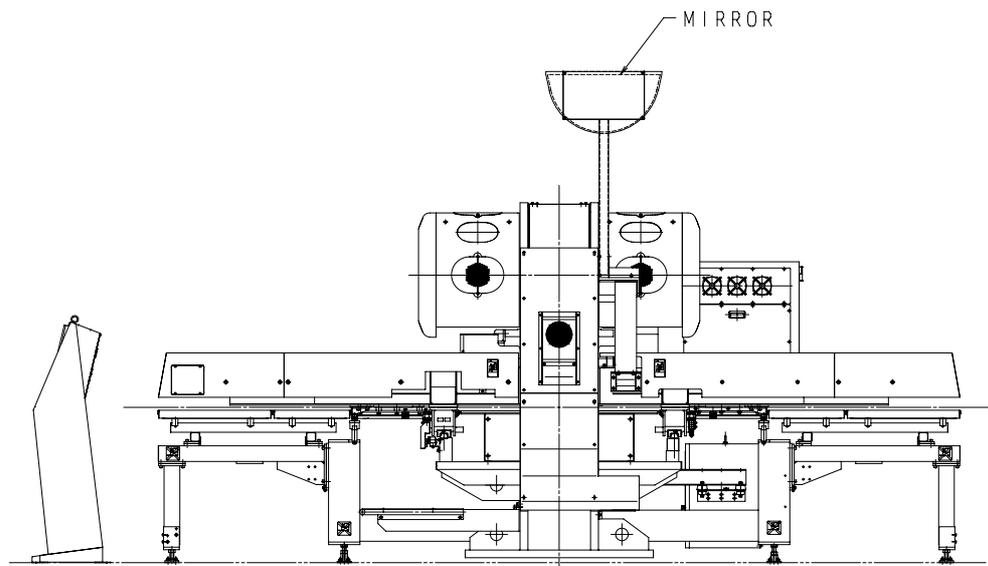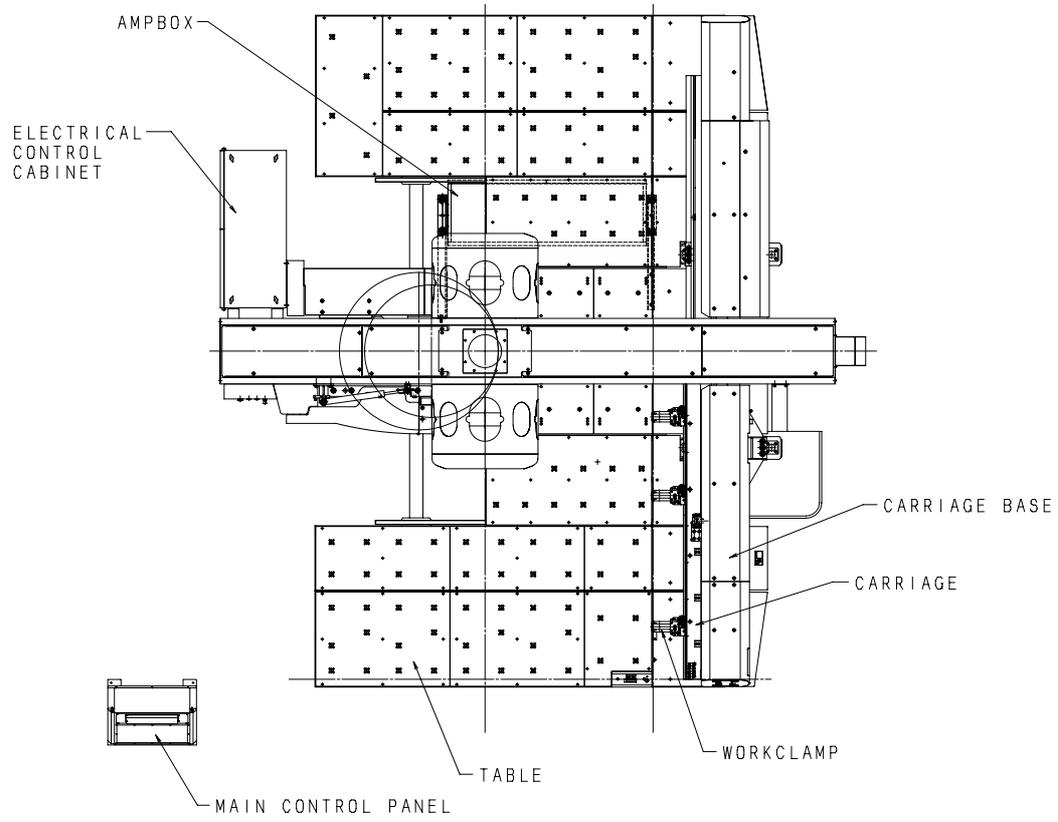
SPECIFICATIONS

Machine specifications

Press model	EMZ3510NT/EMK3510NT	EMZ3610NT/EMK3610NT
Press capacity	300 kN (30.59 metric tons or 33.71 U.S. tons)	300 kN (30.59 metric tons or 33.71 U.S. tons)
Tool storage	45 or 58*** stations (4AI)	45 or 58*** stations (4AI)
	58 or 70*** stations (2AI)	58 or 70*** stations (2AI)
Max. sheet size	1270 × 5000 mm (50 × 196.85")	1525 × 5000 mm (60 × 196.85")
Max. sheet thickness	3.2 mm (0.126")	3.2 mm (0.126")
Max. sheet mass	50 kg (110 lb) at F1	50 kg (110 lb) at F1
	150 kg (330 lb) at F4	150 kg (330 lb) at F4
Y-axis travel	1270 mm (50")	1525 mm (60")
X-axis travel	2500 mm (98.43")	2500 mm (98.43")
Punching accuracy	±0.1 mm (0.004")*	±0.1 mm (0.004")*
	±0.07 mm (0.003")**	±0.07 mm (0.003")**
Strokes per minute	1 mm pitch (5 mm stroke) : 780 min^{-1} (hpm) 25.4 mm pitch (5 mm stroke, X-axis): 500 min^{-1} (hpm) 25.4 mm pitch (5 mm stroke, Y-axis): 330 min^{-1} (hpm)	1 mm pitch (5 mm stroke) : 780 min^{-1} (hpm) 25.4 mm pitch (5 mm stroke, X-axis): 500 min^{-1} (hpm) 25.4 mm pitch (5 mm stroke, Y-axis): 330 min^{-1} (hpm)
Max. press stroke length	37 mm (1.456")	37 mm (1.456")
Max. feed speed (X-axis)	100 m/min (328 ft/min)	100 m/min (328 ft/min)
Max. feed speed (Y-axis)	80 m/min (262 ft/min)	80 m/min (262 ft/min)
Turret speed	30 min^{-1} (rpm)	30 min^{-1} (rpm)
Power supply	27 kVA	27 kVA
Air supply	250 liters/min (8.8 ft^3/min)	250 liters/min (8.8 ft^3/min)
Operating air pressure	0.5 MPa (5.0 kgf/cm^2 or 72 psi)	0.5 MPa (5.0 kgf/cm^2 or 72 psi)
Length	4877 mm (192")	5422 mm (213.46")
Width	5120 mm (201.57")	5120 mm (201.57")
Height	2317 mm (91.22") 3162 mm (124.49") mirror installed	2317 mm (91.22") 3242 mm (127.64") mirror installed
Mass	22.0 metric tons (24.2 U.S. tons)	24.5 metric tons (27.0 U.S. tons)

*When a 914-mm square sheet is punched.   **In the mild mode

(Sheet thickness : 2.3mm)   ***King type-turret (EMK3510NT/EMK3610NT)

NC specifications

NC model	AMNC-F (FANUC 180i-PB)
Controlled axes	4 axes (X, Y, T, C) + A-axis (Press)
Program code	ISO or EIA
Program format	Address and data
Min. dimension	0.01 mm (0.001"), 0.01°
Memory capacity	125 KB (1 program), 10 MB (total)

Operating environment

Ambient temperature	5 to 40°C (41 to 104°F)
Max. relative humidity	75 % without dew condensation
Illumination	Over 500 lux.

Never use the machine in an explosive environment.

Sound level

Sound level (measured at position A shown below):

L_A eq = 86.5 dB (A)	No load (Carriage and carriage base move according to program without punching.)
L_A eq = 91.0 dB (A)*	Mild steel sheet SPCC (JIS), measuring 3.2 mm in thickness and 914 × 914 mm in size, is punched by tool without shear angle
L_A eq = 86.6 dB (A)	Mild steel sheet SPCC (JIS), measuring 1.2 mm in thickness and 914 × 914 mm in size, is punched by tool without shear angle
L_P peak < 130 dB	Mild steel sheet SPCC (JIS), measuring 3.2 mm in thickness and 914 × 914 mm in size, is punched by tool without shear angle

Measuring height: 1.6 m from floor

Measurements made: according to ISO 8500

*91.0 dB (A) > 85 dB (A)
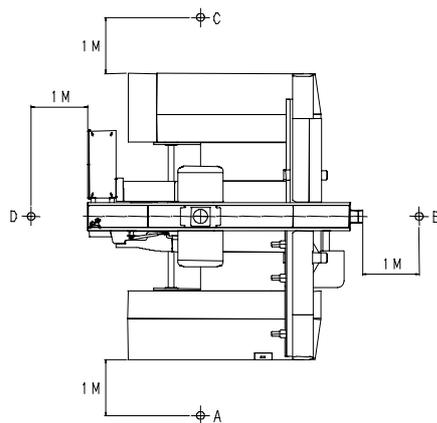
Position A: 91.0 dB (A), maximum level
Position B: 88.3 dB (A)
Position C: 89.7 dB (A)
Position D: 88.5 dB (A)

Machine acoustic power level:
    LWA = 107.33 dB (A) (54.2 mW) in full load.

Determination in accordance with ISO 9614-1.

Advice for decreasing sound level

- Keep the operator away from the machine.
- Use a lower press speed and lower axis feed speed.
- Use tools with shear angle.
- Use tools of smaller size.
- Enclose the machine with soundproof walls or the like.

It is also recommended to wear ear protectors.

AMADA

Part I

Installation

Install the machine according to the instructions described in this Part and the instructions given by the AMADA engineer.

LOCATION AND FOUNDATION

Select a location where ample space can be provided around the machine, air compressor and tool storage after their installation, as well as for handling worksheets and parts and performing maintenance. Install an air compressor within a distance of 5 m (15') from the machine.

Install protective devices around the machine.

The location must be isolated from any nearby equipment that produces dust or vibration and at least 3 m (10') from any equipment that produces electrical interference, such as welding, drilling, sanding, or grinding machines.

Provide a firm, level concrete floor for the installation of the machine according to the floor plan provided by AMADA.   (See page I-12.)

LIFTING AND PLACING

⚠ WARNING	● Have qualified personnel perform the lifting work. And use a crane and wire rope sling that have ample capacities. Do not spread the wire rope sling so that its angle exceeds 60 degrees when slinging and lifting.

Lift and carry the machine.   Use a crane and wire rope sling with capacities high enough to carry the machine and main control box that weigh:

    EMZ3510NT/EMK3510NT: 22.0 metric tons (24.2 U.S. tons)
    EMZ3610NT/EMK3610NT: 24.5 metric tons (27.0 U.S. tons)

    Main control box: Approx. 100 kg (220 lb)

To lift the machine, attach the wire rope sling to the two ribs located below the top covers.   Balance, lift, and place the machine carefully while protecting it from impacts.

*L (distance between ribs)
EMZ3510NT/EMK3510NT: 2940 mm (115.75")
EMZ3610NT/EMK3610NT: 2940 mm (115.75")

NO MORE THAN 60°

RIBS

L

45°

NOTICE

● A hard disk is installed in the main control box.   Do not vibrate, shock, stroke, and sway the main control box.

● Anchor the main control box to the floor so that it cannot be moved or tilted.

● Take the utmost care when moving the machine for relocation or other
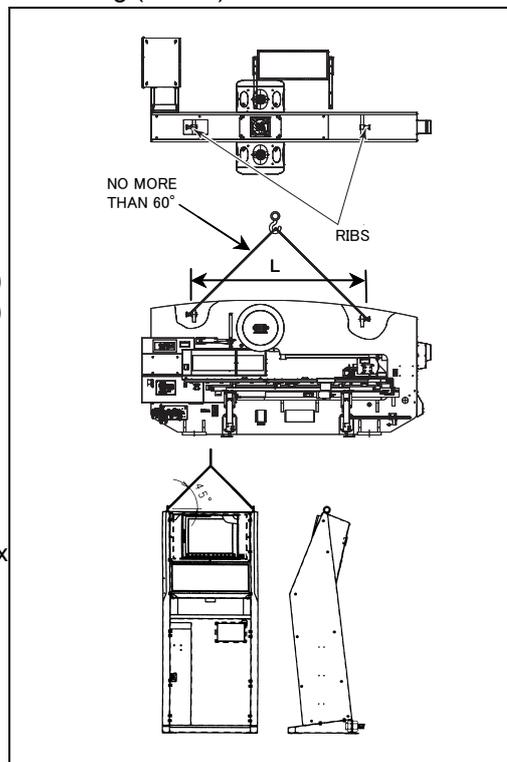
CLEANING

After installing the machine, remove the rust preventive from its surfaces by using cleaning oil, and then apply machine oil to the parts that may rust.

NOTICE

● Never use a scraper or solvents which may damage the coated surfaces of the machine.

LEVELING

Place spirit levels on the top surface of the upper turret disk in the X- and Y-axis directions.   Insert an accessory shim between each machine frame base and its base plate to level the machine.
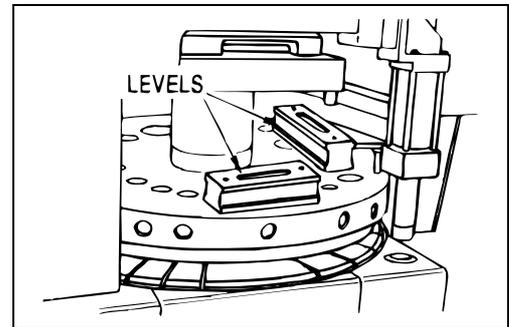
Lift the machine with a hydraulic jack to insert the shims.   Do not lift the bottom of the electrical control cabinet.   The machine must be level to within ±0.05 mm/m in both the X- and Y-axis directions.

After leveling the machine, insert the anchor bolt through the holes in each base plate and its machine frame base from below, fit the lock nut on the anchor bolt, and fix the anchor bolt with concrete.   When the concrete is completely dried, securely tighten the lock nuts to fix the machine.
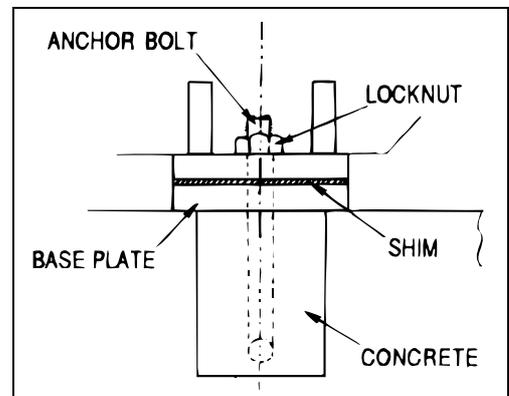
SUPPLYING COMPRESSED AIR

The machine require clean, dry air of 250 liters/min (8.8 ft³/min) with an operating pressure of 0.5 MPa (5.0 kgf/cm² or 72 psi).   It is thus necessary to use an air compressor with a capacity of over 2.2 kW (3 HP).   Install the air compressor within a distance of 5 m (15') from the machine to minimize the loss of pressure.

Use a pipe or hose with an inside diameter of 1/2" to connect the air compressor with the machine, and connect the pipe or hose to the 1/2" air inlet of the air pressure control unit.

NOTE

● If the air compressor must be installed more than 5 m (15') away from the machine, use a pipe or hose with an inside diameter of more than 3/4".

AIR PRESSURE CONTROL UNIT
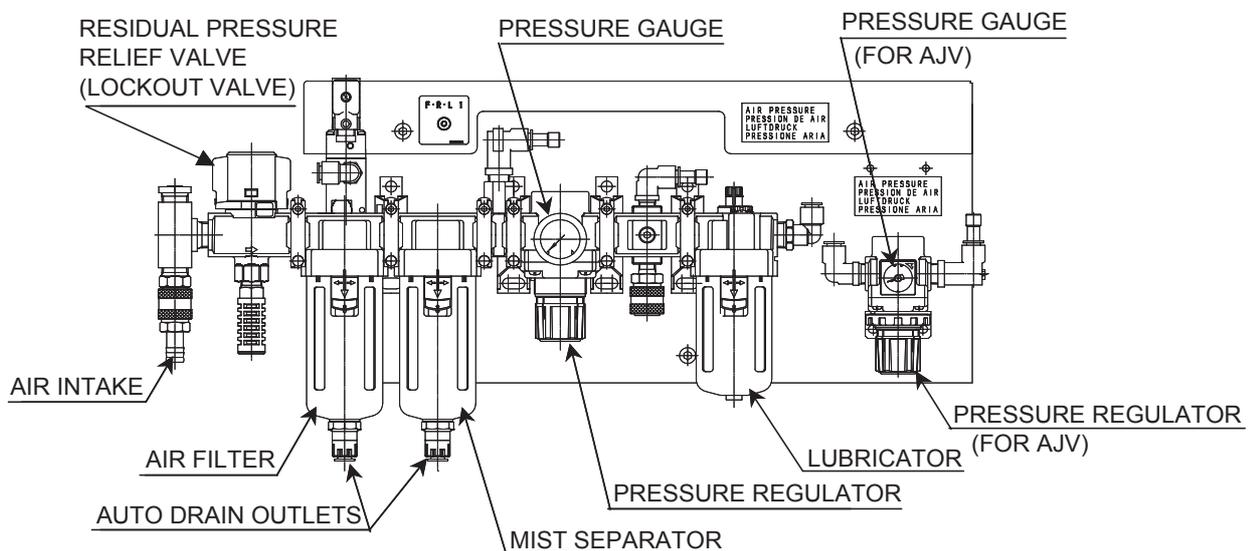
Set the operating pressure at 0.5 MPa (5.0 kgf/cm² or 72 psi) for the main air system, the striker air blow system and the servomotor valve lubrication system by pulling out the knob of the pressure regulator and turning the knob clockwise to increase the pressure or counterclockwise to decrease it.   Push in the knob when the pressure is set.

Keep the level of oil in the lubricator above the line marked on the lubricator.   The recommended oil is Exxon Teresstic 33, Mobil DTE Oil Light, or Shell Tellus Oil 32.   Refer to Part VIII, Maintenance, for adjustment of the amount of oil drops.
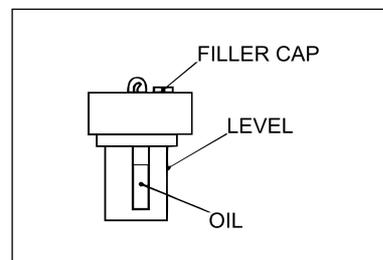
INSTALLING FRONT AND REAR SIDE TABLES

Install the front and rear side tables as described below.

1. Move the connecting part of the side table to the guide in the connecting part of the sub guide arm.   Connect the side table to the sub guide arm with four fixing bolts.

CONNECTING PARTS

FIXING STAND

SIDE TABLE STAND   SIDE TABLE

FRAME   SUB GUIDE ARM

FRAME   SUB GUIDE ARM   SIDE TABLE STAND   SIDE TABLE
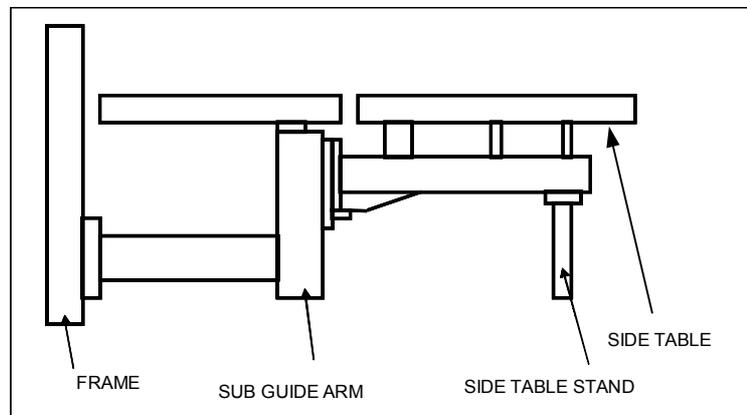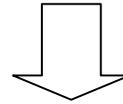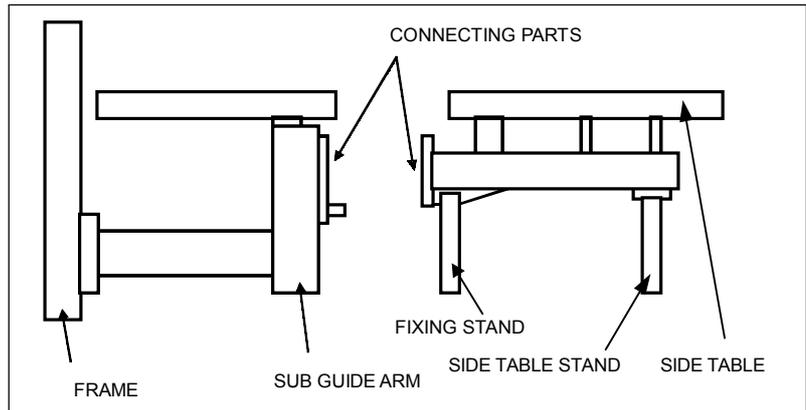
2. Remove the fixing stand.

3 Place auxiliary blocks below the sub guide arm and the side table stand.
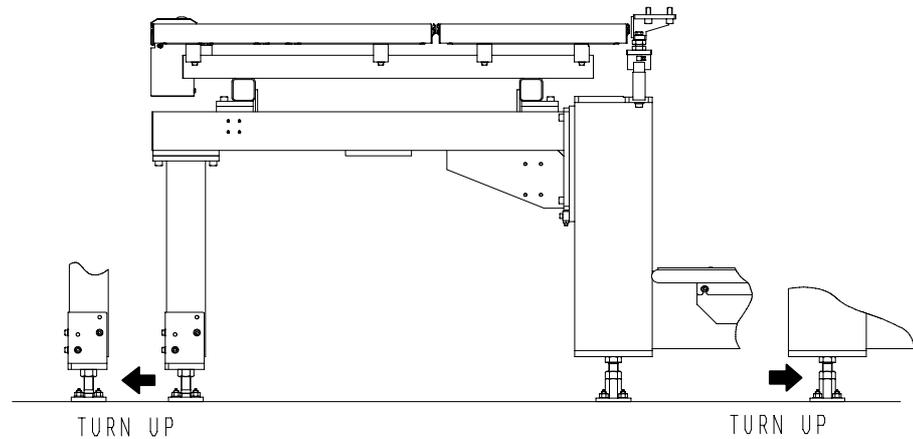
TURN UP   TURN UP

4 Turn up the bolt of each auxiliary block until it supports the bottom surface of the sub guide arm or side table stand.

<u>NOTICE</u>

● If the auxiliary block bolt is turned up excessively, the LM guides may interfere with the sub guide arm or side table stand when it passes over the sub guide arm or side table stand.   Turn up the bolts so that the sub guide arm and side table stand are raised by hits lightly.(about 0.05mm).

5 Fix the auxiliary block bolts with the lock nuts.

6 After positioning, fix the auxiliary blocks with anchors.

Connect the cables from the machine as follows:

Connect the cable YF to the relay box F.

Connect the cable Y18 to the relay box R.

Connect the cable S18 (CE) to the relay box for the maintenance table limit switch.

MAINTENANCE TABLE LS

RELAY BOX(R)

RELAY BOX(F)
X-GAUGE BLOCK
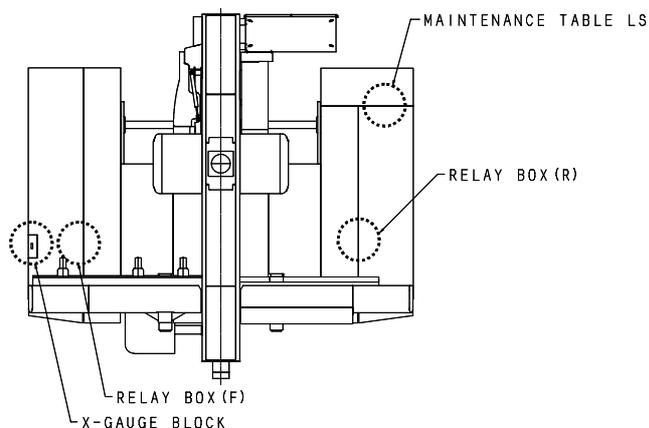
Connecting air hoses

Connect the red and blue air hoses from the machine to the air plugs of the X-gauge block assembly and free-motion bearing assembly.

CONNECTING ELECTRIC POWER

⚠ WARNING	● Have a qualified electrician carry out all electrical work in order to prevent injuries or accidents.

Use a power supply that is not shared by a welding, drilling, sanding, or grinding machine that can cause electrical interference.   This machine requires a power supply of 27 kVA, and the voltage should be within 200 VAC ±10 %.   Use a power cable with conductors, each having a cross section of 38 mm^2.   The lead of the ground conductor should be longer than that of the power cable conductors.

1   Pull the power cable from the shop circuit breaker through the power inlet into the electrical control cabinet.

POWER INLET
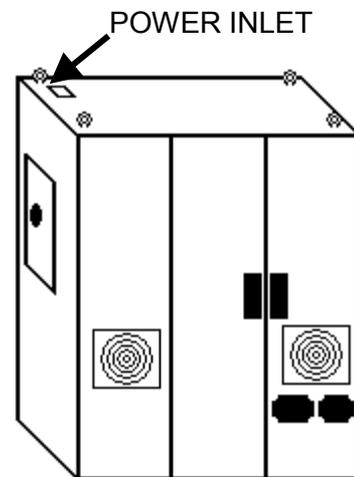
2   Connect the three power cable conductors and grounding conductor to the primary terminal block.

PRIMARY TERMINAL BLOCK
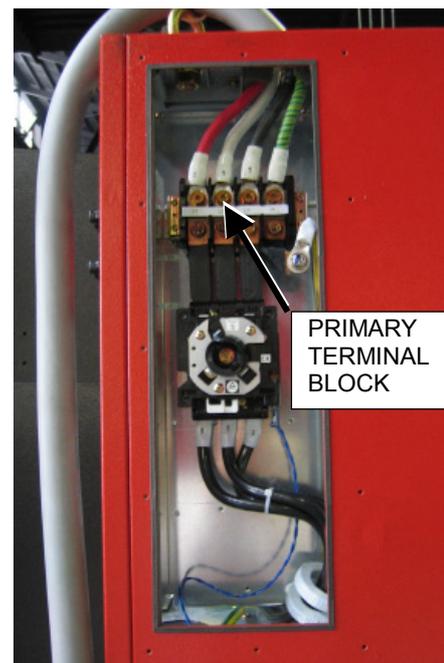
3   Install the cover and
      handle of the machine
      circuit breaker switch.

                NOTE

● Connect the cable of the auxiliary control stand to the receptacle in the
  electrical control cabinet

Electrical connections of electrical control cabinet and main control panel
Line that connects

Cable name	Function	Connection tip
WE1	Round conductor	Ground terminal
WE2	NC power on/off, NC reset, stop, etc	PD connector on lower right metal plate in control box
WE3	Safety device reset switch etc	EUPD connector on HMZF1 board
WE4	Safety device on LED etc	PD2 on HMZF1 board
WE5	I/O link	JD44 connector on NC unit
WE6	I/O link	JD1B connector on I/O board 1
WE7	Emergency switch	Terminals
HSSB	HSSB	COP7 on HSSB board

HMZF1 BOARD

NC UNIT

TERMINALS

GROUND TERMINAL
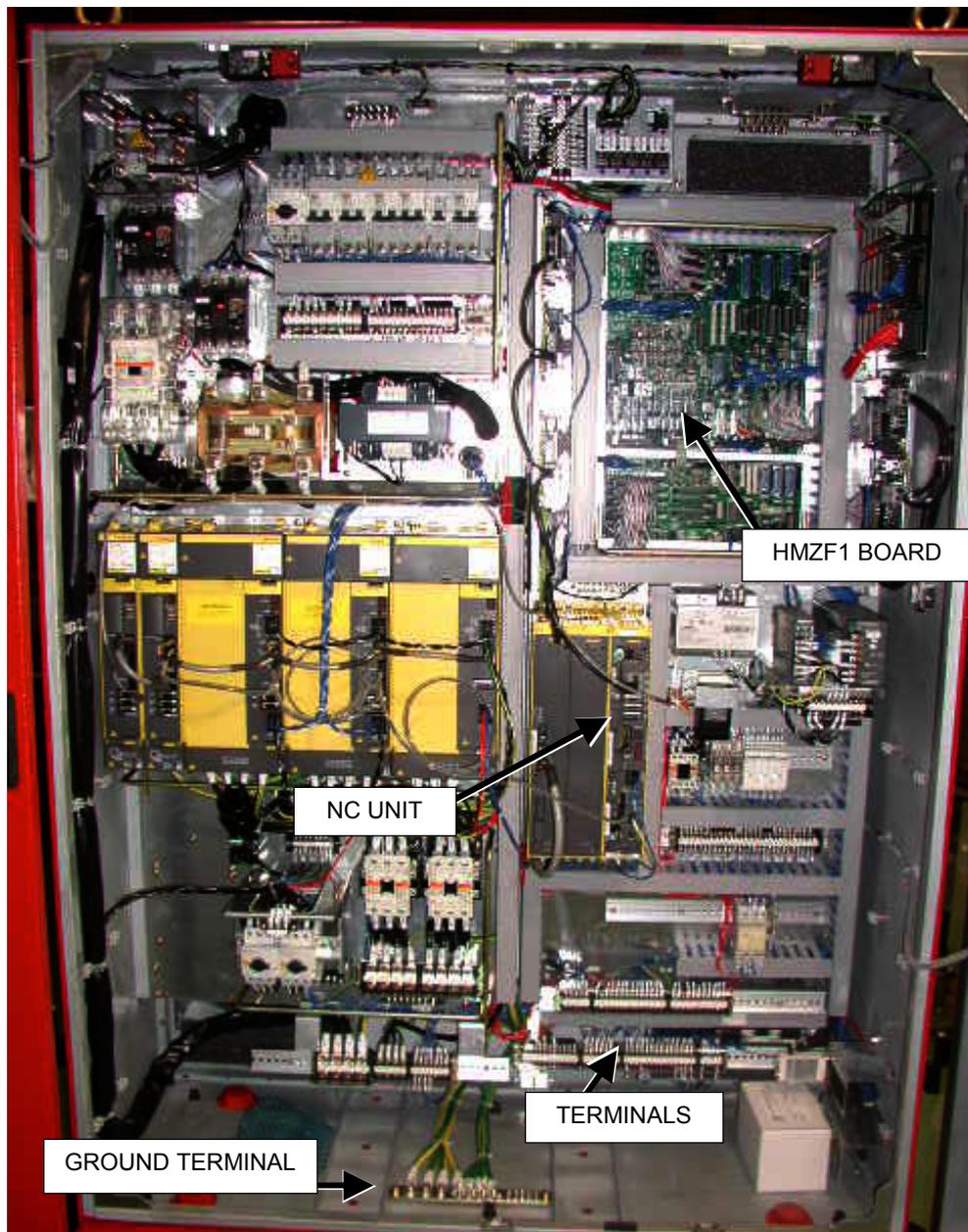
INSTALLING MIRROR

Install the mirror (standard accessory) for checking the area at the rear of the machine to the frame with four bolts as shown below.
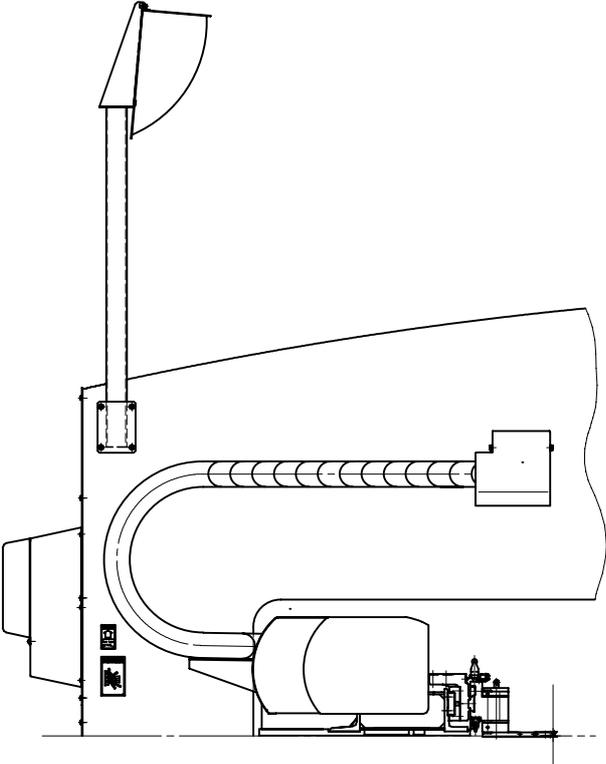
INSTALLING SUBCONTROL STAND (OPTION)

Install the optional subcontrol stand in the shaded area shown below.

Unit: mm {in.}

WORK TRAVERSE AREA

5000 {196.9}

2500 {98.4}

2500 {98.4}

5000 {196.9}

R1600 {63.0}

WORK TRAVERSE AREA

SUBCONTROL STAND

MAIN CONTROL BOX

A | A | 1600 {63.0}
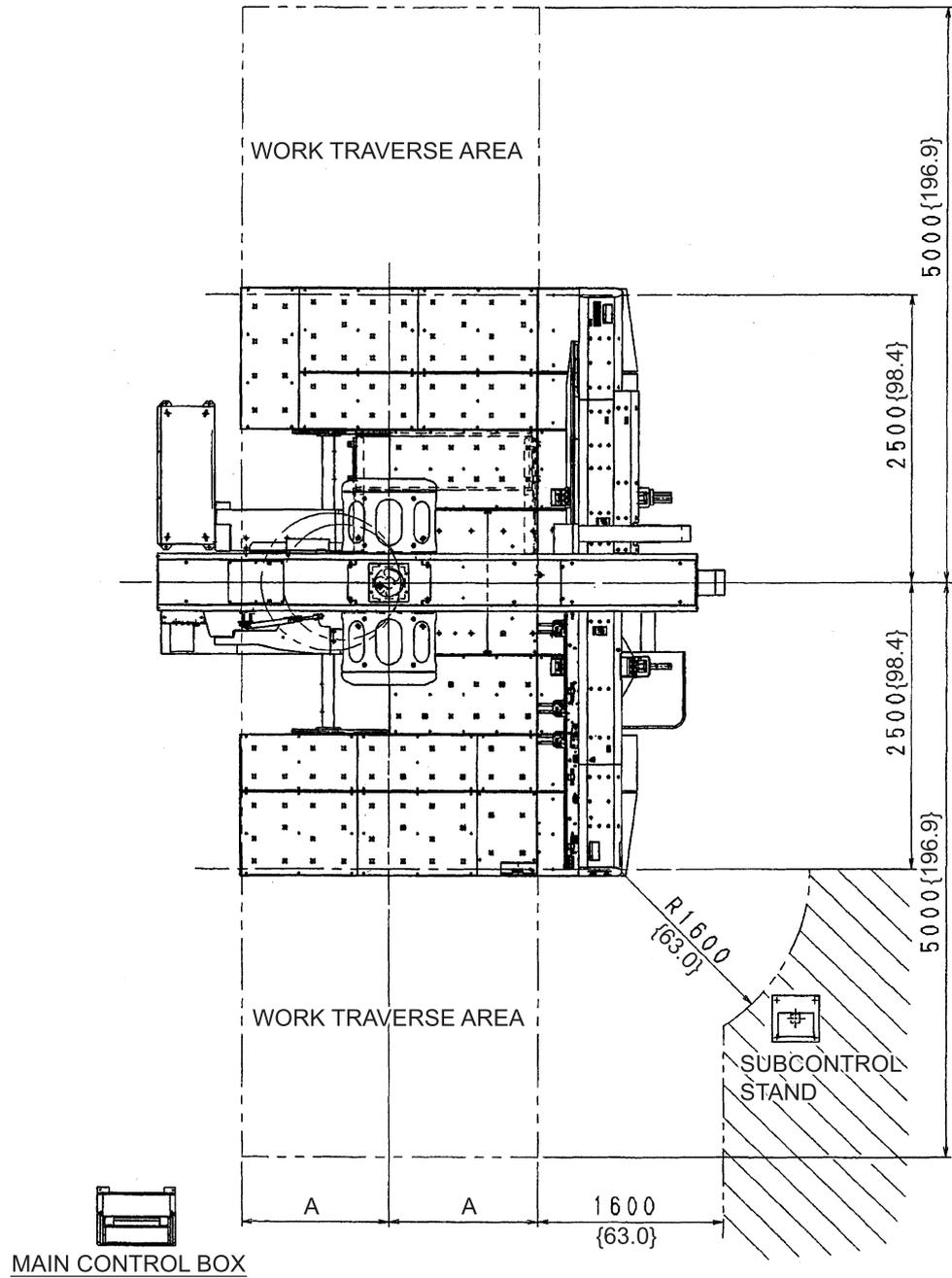
A: EMZ3510NT/EMK3510NT: 1270 {50.0}
EMZ3610NT/EMK3610NT: 1525 {60.0}

FLOOR PLAN DRAWINGS

EMZ3510NT / EMK3510NT floor plan

(J-ANCHOR BOLTS)
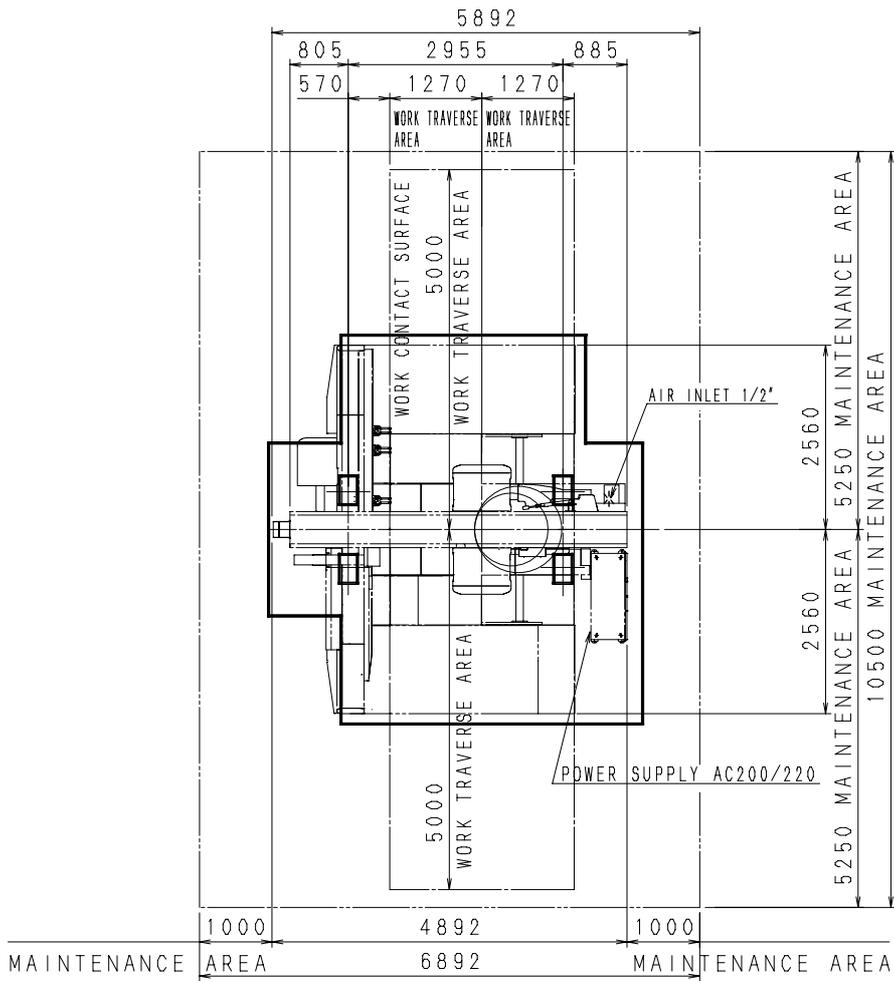
Unit: mm

1100 2955 1100
ANCHOR BOLT PITCH
125 125 125 125
1500
1200
220
525
180
525
5400
1200
1500
1000 3370 785
5155

B
PASS LINE
600
800
200
1000
STONES
DRAIN PIPE
LENGTH 400
CONCRETE
CEMENT SAND STONE
1 : 2 : 4

SECTION A-A

4-BASE PLATE(6874479)
SHIM   (6874486)
525 75
124
42
50
600
505
32
95
4-ANCHOR BOLT L-TYPE
M30X630
4-NUT   M30
4-WASHER   M30
180 220
400

50 50
20 260 20
125 125
250
DETAIL B(S=1:20)
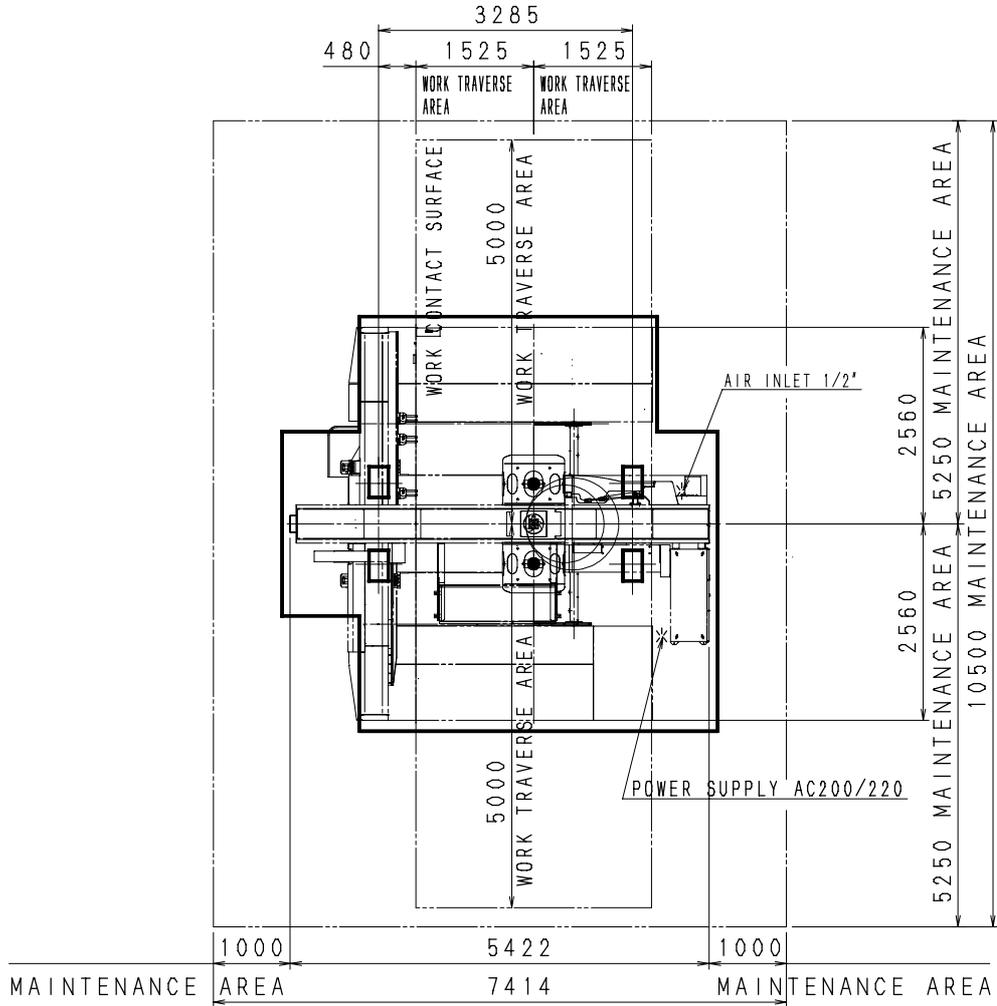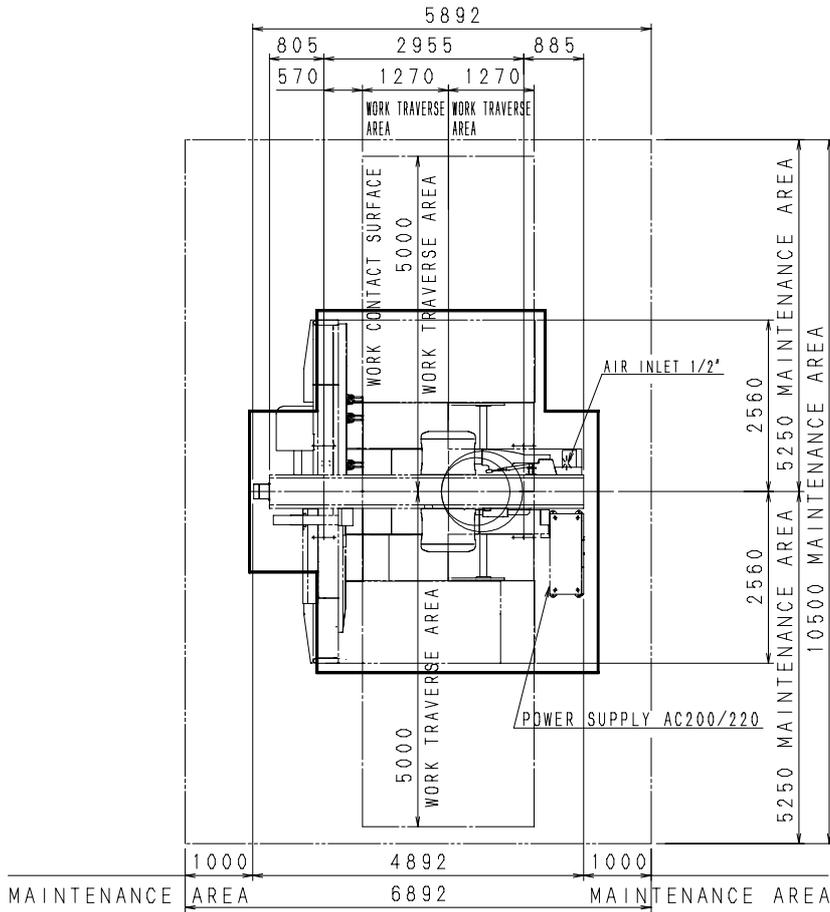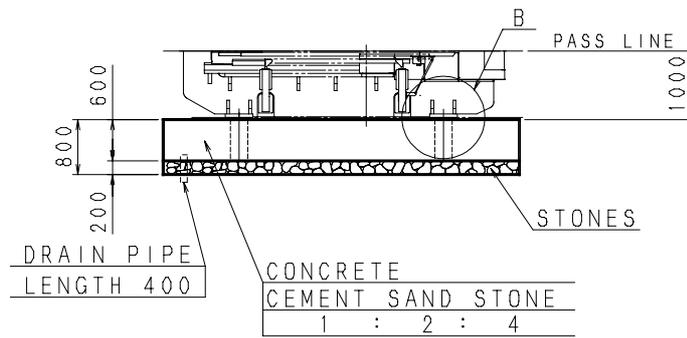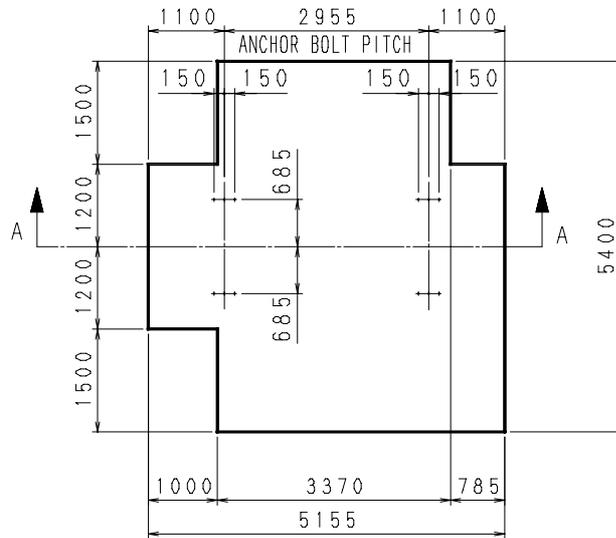
EMZ3610NT / EMK3610NT floor plan

(J-ANCHOR BOLTS)

Unit: mm

Unit: mm

SECTION A-A

4-BASE PLATE(6874479)
SHIM   (6874486)

4-ANCHOR BOLT L-TYPE
           M30X630
4-NUT   M30
4-WASHER   M30

DRAIN PIPE
LENGTH 400

CONCRETE
CEMENT SAND STONE
  1 : 2 : 4

PASS LINE

STONES

DETAIL B(S=1:20)

ANCHOR BOLT PITCH

I-15

EMZ3510NT / EMK3510NT floor plan

(AY-PLATES)

Unit: mm

1100   2955   1100
ANCHOR BOLT PITCH

150   150   150   150

1500

685

1200

A ——►   A

685

1200

1500

5400

1000   3370   785

5155

B   PASS LINE

600

800

200

1000

STONES

DRAIN PIPE
LENGTH 400

CONCRETE
CEMENT SAND STONE
1 : 2 : 4

SECTION A-A

4-BASE PLATE (6874479)
SHIM   (6874486)

178

12-ANCHOR BOLT C-1615

75   135

685   50

96

50 (SHIM)

97

32

4-BOLT   M30
4-NUT   M30
4-WASHER M30

50   50
20   260   20

150   150

DETAIL B (S=1:20)

EMZ3610NT / EMK3610NT floor plan

(AY-PLATES)

Unit: mm

1250 3285 1100
ANCHOR BOLT PITCH
150 150 150 150

1500
1200
1200
1500

685

685

5400

A   A

1000 3850 785
5635

B
PASS LINE
1000

600
800
200

STONES

DRAIN PIPE
LENGTH 400

CONCRETE
CEMENT SAND STONE
1 : 2 : 4

SECTION A-A

12-ANCHOR BOLT C-1615

4-BASE PLATE (6874479)
SHIM   (6874486)

75   135
685   50

50   50
20 260 20

178

96
50 (SHIM)
1

97   32

150   150

4-BOLT   M30
4-NUT   M30
4-WASHER M30

DETAIL B (S=1:20)

ACCESSORY PARTS

Electrical control cabinet level adjuster bolts

Make the electrical control cabinet self-standing.

Remove the brackets from the electrical control cabinet, and make the electrical control cabinet stand on its own as described below.

1   Open the door of the electrical control cabinet, remove the six M10 nuts (indicated by circles in the photo below) in the reinforcing ribs in the middle and lower positions, and loosen the four jack bolts (M20 and P = 2.5).

2   Loosen the four jack bolts until they completely touch the ground or floor surface, or the surface of the block on which the electrical control cabinet is installed, and adjust them so that they are parallel within 1 to 5 mm.

JACK BOLTS   RUBBER
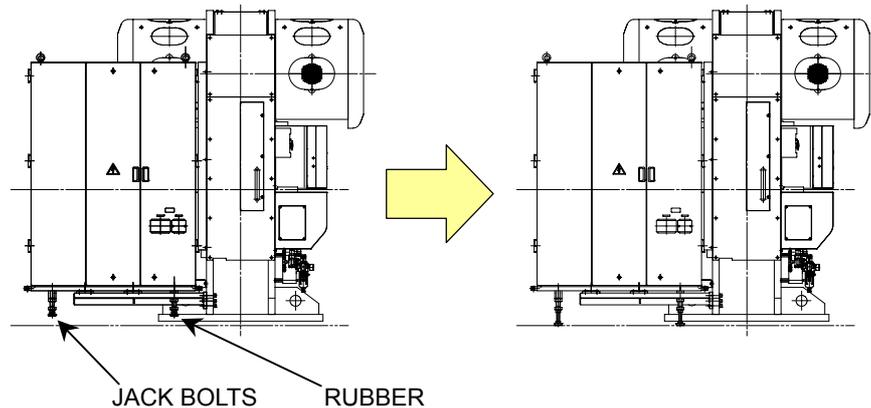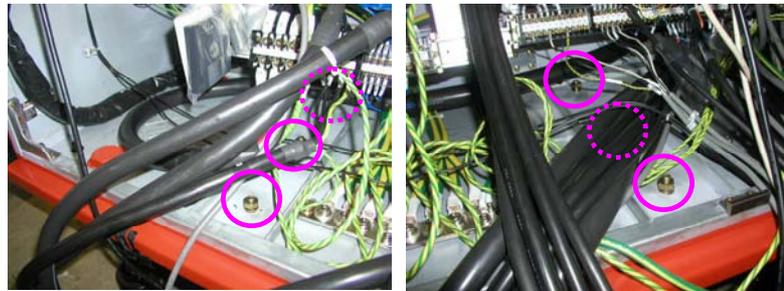
NOTICE

● Loosen the four jack bolts two more turns (or 5mm) after their contact with the supporting surface while balancing them and checking for interference between the electrical control cabinet and the frame fastening brackets. Check that the electrical control cabinet is self-standing.   Then securely fix the jack bolts with lock nuts.

Part II

Controls

The switches and other devices used to operate and control the machine are described in this Part.

ELECTRICAL CONTROL CABINET

Machine circuit breaker switch

Used to turn on and off the power of the machine and the NC unit.   The flow of overcurrent automatically turns off the power of the machine and the NC unit.

The lever can be padlocked when the switch is turned to OFF.

NOTICE

● To turn on the NC unit, first turn the machine circuit breaker switch to ON. Then, press the POWER ON button on the main control panel.

● To turn off the NC unit, first press the POWER OFF button.   Make sure that the POWER ON lamp goes out or the message "It is now safe to turn off your computer" is displayed.   Then, turn the machine circuit breaker switch to OFF.

● If overcurrent flows through the machine circuit breaker during operation, the breaker trips and cuts off the current automatically.   Eliminate the cause of the overcurrent and turn the machine circuit breaker switch to ON, if the machine circuit breaker switch is turned off due to overcurrent.

Controls in electrical control cabinet

[1] TURRET switch

Turned to ON to rotate the turret.   Normally set to ON.

[2] STRIP MISS switch

Turned to ON to enable the stripping failure detection function.   Normally set to ON.

[3] STRIKER switch

Used for maintenance purposes.   Normally set to CENTER.

[4] INDEX switch

Turned to ON to rotate the auto-index device.   Always set to ON.

[5] T. ALIGN switch

Turned to ON to stop the A-axis servomotor when the TOOL CHANGE keyswitch on the subcontrol panel "B" is turned to ON.   Normally set to OFF.   Used in the ON position only for maintenance purposes.

[6] Interfaces
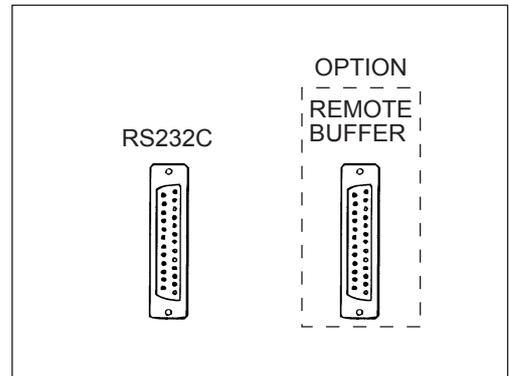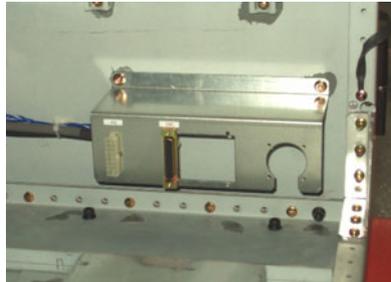
The left-hand RS232C interface is used for the input and output of punching programs and custom macro programs.   Its connector configuration is as shown below.   This interface is used for connecting the CNC unit to an external device.   The right-hand optional interface is connected to a remote buffer and used for the DNC operation of the machine.

NOTE

● When using these interfaces, properly set the input and output parameters.

CONNECTOR CONFIGURATION

1	2	3	4	5	6	7	8	9	10	11	12	13
FG	SD	RD	RS	CS	DR	SG	CD					
	14	15	16	17	18	19	20	21	22	23	24	25
							ER					+24N

CHANNELS FOR SETTING INPUT AND OUTPUT PARAMETERS

    0: Handy file unit

    1: RS232C interface

    2: Not used

    3: Remote buffer

    4: Built-in floppy disk drive

MAIN CONTROL PANEL
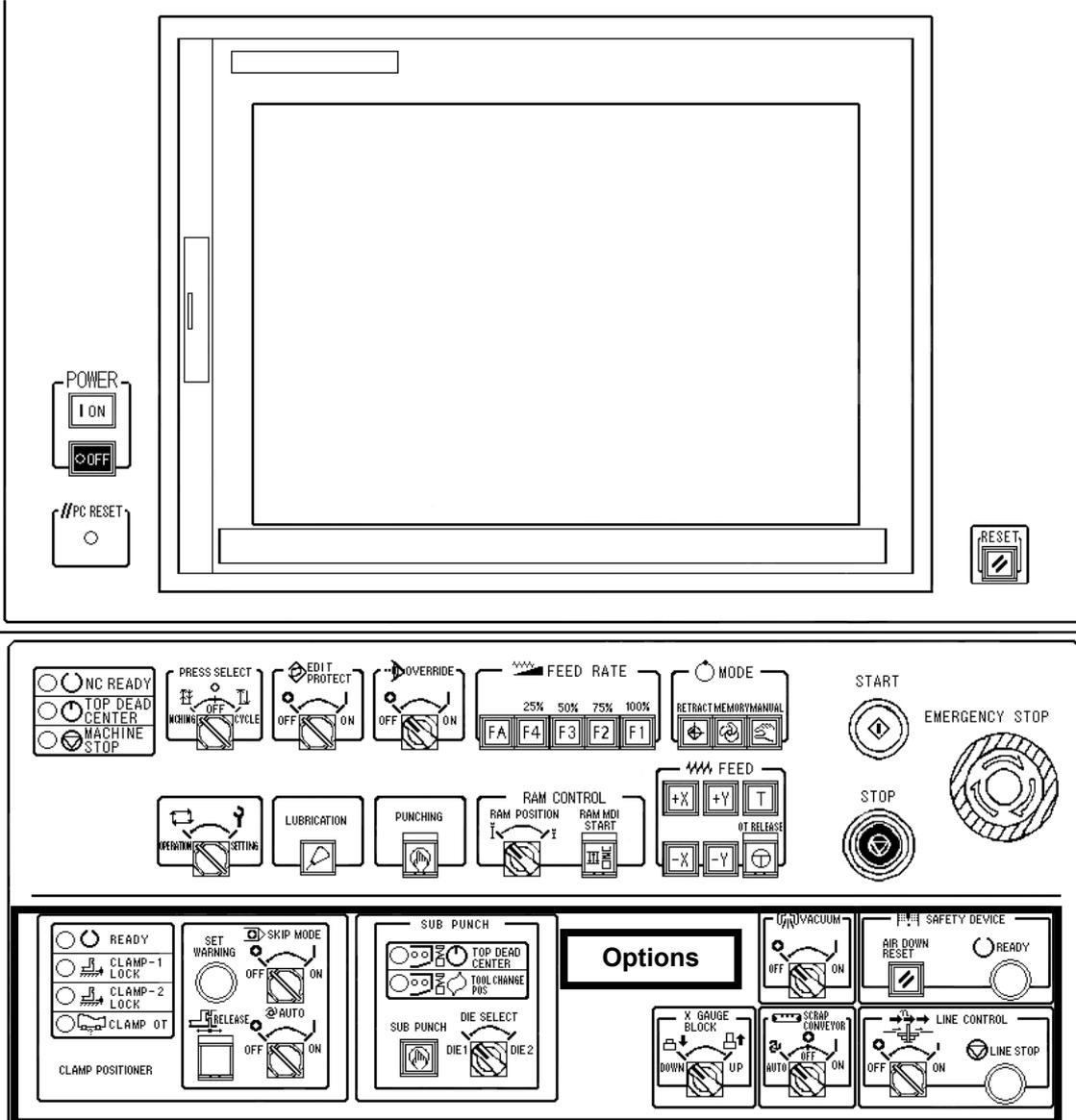
[1] POWER ON and OFF buttons

Used to turn on and off the power of the NC unit.

POWER ON button

Pressed to illuminate itself and turn on the power of the NC unit.   After about 2 minutes, the initial display of the AMNC appears on the screen.

NOTE

● When turning on the power of the NC unit, turn the machine circuit breaker switch on the electrical control cabinet to ON and then press the POWER ON button.

POWER OFF button

When the POWER OFF button is pressed, the computer executes the power-off processing procedure, and the NC unit is turned off after approximately two minutes.   The lamp of the POWER ON button goes out simultaneously.

NOTICE

● When turning off the power of the NC unit, first press the POWER OFF button.   Make sure that the POWER ON lamp goes out or the message "It is now safe to turn off your computer" is displayed.   Then, turn the machine circuit breaker switch on the electrical control cabinet to OFF.
A hard disk system error may occur if the machine circuit breaker is turned to OFF when the POWER ON lamp is lighted or the message "It is now safe to turn off your computer" is not displayed.

[2] RESET (▱) key

Pressed to reset the NC unit.

[3] Indicator lights

NC READY light (green)

Illuminates to indicate that the NC unit is ready for operation.

TOP DEAD CENTER light (green)

Illuminates to indicate that the press is at the top dead center.

MACHINE STOP light (red)

Illuminates to indicate that the machine is stopped by a program stop (M00) or optional stop (M01) command.

[4] PRESS SELECT keyswitch

Used to select the press operation pattern as shown in the table below.

NC mode	Keyswitch position	Press operation pattern
MEMORY	INCHING	The press does not operate at all.
	OFF	
	CYCLE	The press punches one cycle after positioning.
MANUAL	INCHING	The press inches as long as the PUNCHING button is pressed and held. The rotational direction of the indicator is counterclockwise.
	OFF	The press does not operate at all.
	CYCLE	

NOTE

● In the INCHING mode, the press moves up and down as long as the PUNCHING button is pressed and held.   The press automatically returns to the top dead center when the NC mode is changed from MANUAL or the RESET key is pressed.

[5] EDIT PROTECT keyswitch

Turned to ON to protect the programs stored in the memory of the NC unit from being overwritten or erased.   Normally set to ON, except when editing the program or programs.   Turned to ON to lock the keyswitch and remove its key.

Connecting to PANEL *i* and to CNC unit

● The storage media of the PANEL i are the CF memory and floppy disk of the main control panel.   The storage medium of the CNC unit is its memory. Note that the data save-to location varies with the automatic operating mode selected.

The RS232C port at the rear of the main control panel is connected to the PANEL i.   The RS232C port of the electrical control cabinet is connected to the CNC unit.   Note different that the different RS232C ports have different "connect to" devices.

MAIN CONTROL BOX

PANEL i

STORAGE MEDIUM

PROGRAM PUNCH/READ

SERIAL INTERFACE DEVICE

RS232C

PROGRAM SEND /RECEIVE

HSSB

PROGRAM UPLOAD/DOWNLOAD

DNC HOST

RS232C

CNC MEMORY

R／B

DNC HOST

FANUC CNC UNIT

RS232C

ELECTRICAL CONTROL CABINET
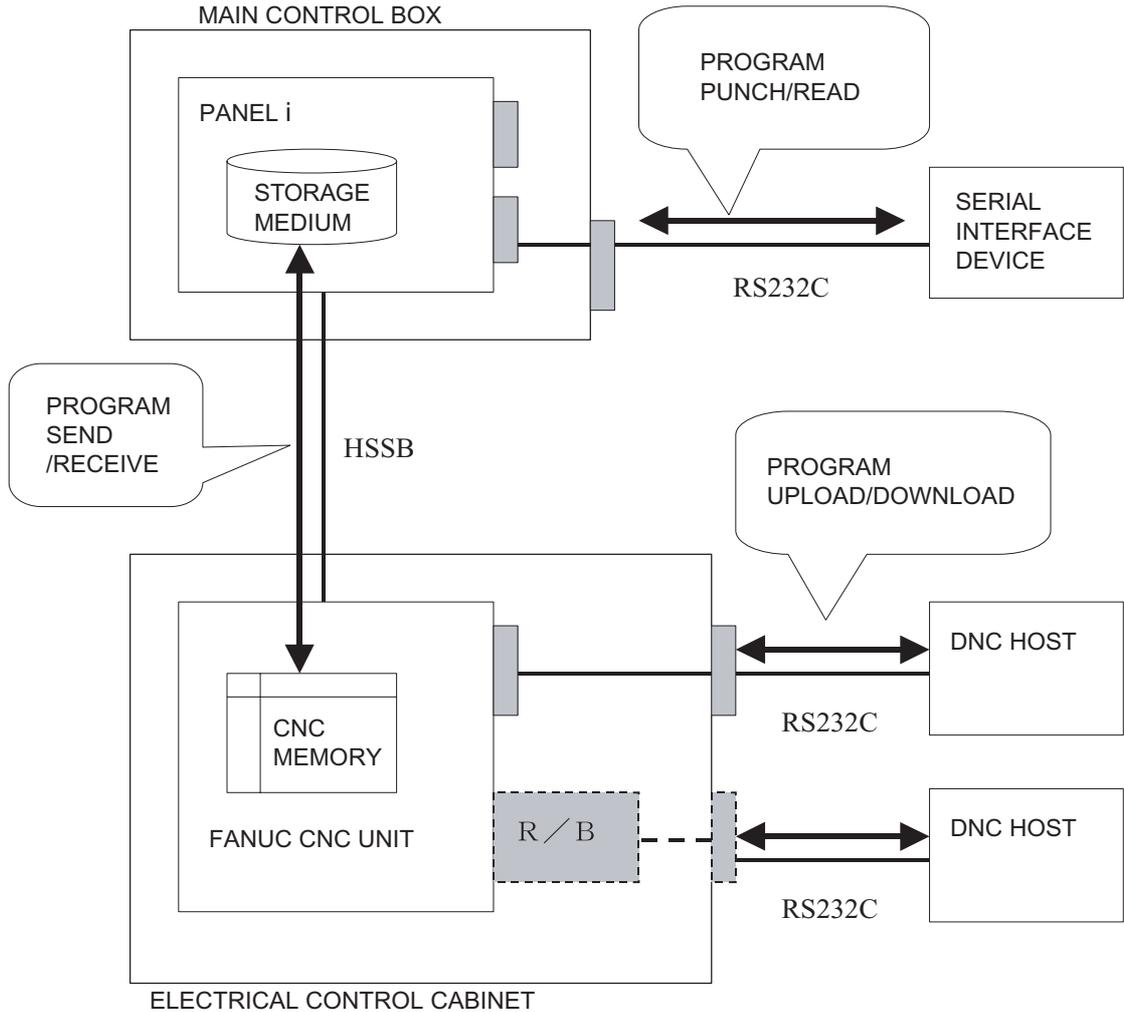
NOTE

●When the RS232C port is connected through the remote buffer (R/B) to the CNC unit, programs can be downloaded to the CNC memory, but cannot be uploaded from the CNC memory.

<automatic operating mode is PROGRAM or SCHEDULE>

Programs are stored in the PANEL i.   The program for punching each job is selected and transferred to the CNC unit.

<automatic operating mode is CNC>

Programs are stored in the CNC memory and are only displayed on the PANEL i.

[6] OVERRIDE switch

Enables the override detection function and repositioning confirmation function.

Once the program is run, the function of detecting only the dead zone in the override zone and the repositioning confirmation function are enabled.

Turned to OFF to enable the same functions as enabled for the second and subsequent worksheets by turning to the ON position.

Once the program is run in this condition, all functions are disabled.

Override first worksheet discrimination function available (standalone specification)

| | OVERRIDE switch | | | |
| | ON | | OFF | |
	First worksheet	Second and subsequent worksheets	First worksheet	Second and subsequent worksheets
Distortion region	Detected (Worksheet can be punched by pressing START button)	Not detected	Not detected	Not detected
Dead zone region	Detected (Worksheet can be punched by pressing PUNCHING button and START button)	Detected (Worksheet can be punched by pressing PUNCHING button and START button)	Detected (Worksheet can be punched by pressing PUNCHING button and START button)	Not detected

Override first worksheet discrimination function not available (line specification)

| | OVERRIDE switch | | | |
| | ON | | OFF | |
	First worksheet	Second and subsequent worksheets	First worksheet	Second and subsequent worksheets
Distortion region	Detected (Worksheet can be punched by pressing START button)	Not detected	Not detected	Not detected
Dead zone region	Detected (Worksheet can be punched by pressing PUNCHING button and START button)	Detected (Worksheet can be punched by pressing PUNCHING button and START button)	Not detected	Not detected

● To perform MEMORY mode operation with a new program, turn the OVERRIDE switch to ON.

● To resume its operation after the machine was paused by the override detection function, check the workclamp position and worksheet condition, and press the START button.

● When a workclamp is in the override region, the machine pauses each time it punches the worksheet.

● To perform a nibbling or other continuous punching operation in the override region, press the START button after the pause caused by the override detection function, and then immediately press and hold the START button. This allows the punching operation to be continued without the pause caused by the override detection function.

● If the worksheet cannot be punched when the START button is pressed, one of the workclamps is in the dead zone region (the "Dead zone" message is shown). Repeat the procedure from zero-return.

For how to resume the operation of the machine, refer to "Operation interruption" in Part VI, Operation.

[7] FEEDRATE buttons

Pressed to set the feed speed of the carriage (X-axis) and carriage base (Y-axis) and the indexing speed of the turret (T-axis) and auto-index device (C-axis). Each illuminates when the corresponding speed is selected.

Button	X- and Y-axes	T-axis	C-axis
F1	100/80 m/min (3937/3149 ipm)	30 min^{-1} (rpm)	60 min^{-1} (rpm)
F2	75/60 m/min (2952/2362 ipm)	30 min^{-1} (rpm)	60 min^{-1} (rpm)
F3	50/40 m/min (1968/1574 ipm)	15 min^{-1} (rpm)	30 min^{-1} (rpm)
F4	25/20 m/min (984/787 ipm)	15 min^{-1} (rpm)	30 min^{-1} (rpm)

● FA is the mode that emphasizes the stability of positioning. This mode can be selected at all speeds F1 to F4.

The feed speed of the carriage and carriage base in the MANUAL mode is 5.2 m/min (204 ipm) regardless of the selection made here.

The turret indexing speed in the MANUAL mode is 3 min^{-1} (rpm) regardless of the selection made here.

[8] MODE buttons

Pressed to select an NC mode.   Each illuminates when the corresponding NC mode is selected.

RETRACT button

Selects the RETRACT mode to permit the manual zero-return of an axis or axes.

MEMORY button

Selects the MEMORY mode to permit the execution of a program stored in the memory of the NC unit.

MANUAL button

Selects the MANUAL mode to permit the manual feed of the carriage (X-axis) or carriage base (Y-axis), rotation of the turret (T-axis), or direct programming.

[9] SAFETY DEVICE keyswitch

Turned to OPERATION to enable a protective device or devices.   Set to OPERATION during the automatic operation of the machine.   Turn the keyswitch to SETTING, remove the key, and keep it by yourself when performing a preparation or maintenance operation.   The SAFETY DEVICE READY light should then extinguish.

[10] LUBRICATION button

Pressed to lubricate the press.

[11] PUNCHING button (with protective cover)

The press operates to punch the worksheet as long as the button is pressed and held in the MANUAL mode.   When the machine is paused in the dead zone during its automatic operation or when nesting tools are used, the punching operation is enabled by pressing this button and then the START button.

NOTE

● The PUNCHING button is pressed to allow punching when:
  • The PRESS SELECT keyswitch is turned to INCHING.
  • The INDEX PIN switch on the subcontrol panel "B" is turned to IN.
  • The striker is set in the position to allow punching.

[12] RAM POSITION switch

Used to select where to stop the press in a MEMORY mode operation: top dead center or top stroke end.   Normally turned to the right position (top stroke end).   Turned to the left position (top dead center) when the worksheet is warped by the punching operation.

[13] RAM MDI START button (with protective cover)

Used by the AMADA service engineer for maintenance purposes. Pressed to stop the press in the position set on the RAM MDI display.

[14] FEED buttons

These buttons have different functions in the RETRACT mode and the MANUAL mode.

+X, +Y, and T buttons

Pressed to zero-return the carriage (X-axis), carriage base (Y-axis), and turret (T-axis) and auto-index device (C-axis) in the RETRACT mode, respectively.   Each illuminates to indicate that the corresponding axis is zero-returned.

+X, -X, +Y, and -Y buttons

Pressed to feed the carriage (X-axis) and carriage base (Y-axis) in the indicated direction in the MANUAL mode.

[15] OT RELEASE button (with protective cover)

Used to clear the overtravel condition of the carriage (X-axis) or carriage base (Y-axis) in combination with the corresponding FEED button.   These two buttons must be pressed together.

[16] START button

Starts the operation of the machine when pressed in the MEMORY or MDI mode.   Also pressed to move a turret station to the tool change position using the Turret rotation display.   Illuminates to indicate that the machine is operating or its associated sections are operating.

NOTICE

● When "Override" is shown on the MESSAGE display and the machine is paused, check that the worksheet is not distorted, and then press the START button.   The machine resumes the operation to punch the worksheet. When "Dead zone" is shown on the MESSAGE display and the machine is paused, the worksheet cannot be punched by pressing the START button because one of the workclamps is also likely to be punched.

When "Dead zone" is shown, press first the PUNCHING button and then the START button to punch the worksheet.   If this procedure is performed, the machine punches where it may punch one of the workclamps.   Before performing the procedure, check the position of the workclamps.

[17] STOP button

Pressed to stop the operation of the machine.   Illuminates when pressed and stays on for the duration of the stopped condition.

[18] EMERGENCY STOP button

Stops the operation of the machine as soon as pressed in any NC mode, and then locked.   Unlock the button by turning it clockwise, return the machine to the normal condition, and zero-return all axes before starting the machine for another operation.   The machine cannot resume the operation interrupted by the depression of the button.

[19] SAFETY DEVICE & AIR DOWN RESET button

Pressed to reset the actuated protective device or the alarm caused by a low air pressure.   The actuated protective device cannot be reset unless the TOOL CHANGE keyswitch on the subcontrol panel "B" is turned to OFF.

[20] SAFETY DEVICE READY light

Illuminates to indicate that a protective device or devices are turned on. Extinguishes to indicate that the SAFETY DEVICE keyswitch is turned to SETTING, a protective device is actuated, or the TOOL CHANGE keyswitch on the subcontrol panel "B" is turned to ON in the MANUAL mode.

[21] VACUUM switch (option for 1/2" and 1/4" stations)

Turned to ON to enable the vacuum function and perform punching using vacuum.   Turned to OFF to disable the vacuum function and perform punching without using vacuum.

Floppy disk drive

A drive for data input and output using a floppy disk.

Insert the floppy disk all the way into the drive with the label side up. Press the eject button to remove the floppy disk from the drive.

The access LED illuminates or flashes to indicate that data is read from or written to the floppy disk.

NOTICE

● Do not press the eject button while the access LED is illuminated or flashing. If you press the eject button to remove the floppy disk from the drive, the data in the floppy disk may be destroyed.

● The floppy disk drive is susceptible to dust. Keep its acrylic cover closed except when inserting or removing the floppy disk.

CD-ROM drive

A drive to read data from a CD-ROM.

The CD-ROM drive will be used by the AMADA service engineer for maintenance and adjustment.

Press the eject button to insert the CD-ROM into or remove the CD-ROM from the drive.
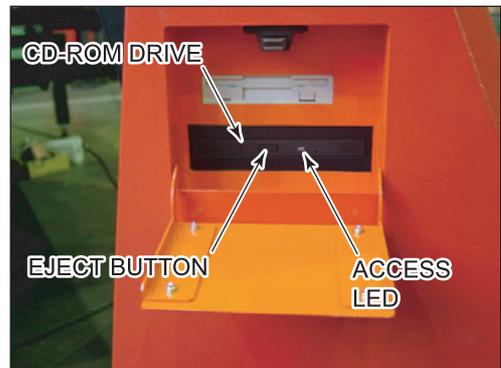
Place the CD-ROM in the tray with the label side up. The access LED is illuminated or flashing while the data is read from the CD-ROM.

NOTICE

● Do not press the eject button while the access LED is illuminated or flashing. If you press the eject button to remove the CD-ROM from the drive, the data read from the CD-ROM may be destroyed.

● The CD-ROM drive is susceptible to dust. Keep its acrylic cover closed except when inserting or removing the CD-ROM.

Interfaces located in main control box
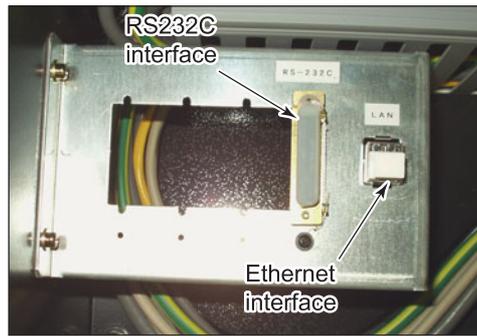
RS232C interface

Used to connect the PANEL i to an external device.

When the interface is located in the main control box, pull the cable from the external device through the hole at the lower rear of the main control box, remove the rear cover, and connect the cable to the interface in the main control box.

HOLE

NOTE

Be sure to use the interface after replacing the rear cover.

Ethernet interface

Used for network connection with the AP100 or ASIS100PCL.

When the interface is located in the main control box, pull the cable from the AP100 or ASIA100 PCL through the hole at the lower rear of the main control box, remove the rear cover, and connect the cable to the interface in the main control box.

HOLE

NOTE

Be sure to use the interface after replacing the rear cover.

Bar code reader interface (option)

Used for connection of the optional bar code reader.   When the machine is network-connected with the AP100 or ASIS100PCL, the optional bar code reader can be used to read the bar code printed on the output document of a part and call the program of the part.

NOTE

● This interface is added on the front of the main control panel.

Controls in main control panel drawer

MDI button   EDIT button

Keyboard interface
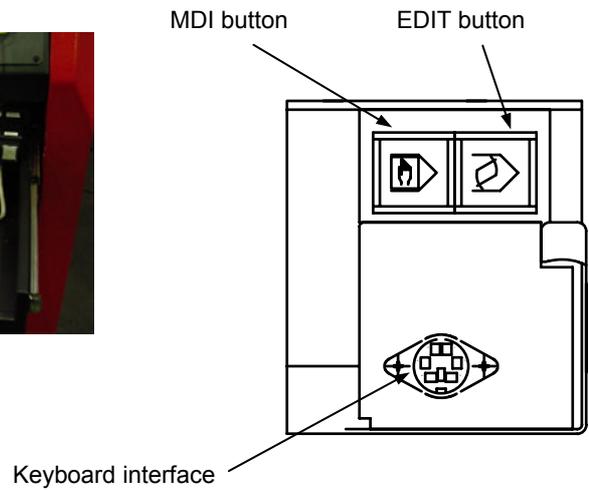
[1] EDIT button

Used for entering a program in the CNC memory.

[2] MDI button

Used by AMADA for maintenance purposes. Do not touch this button.

[3] Keyboard interface

Used for connection of the accessory keyboard.

SUBCONTROL PANEL "A"
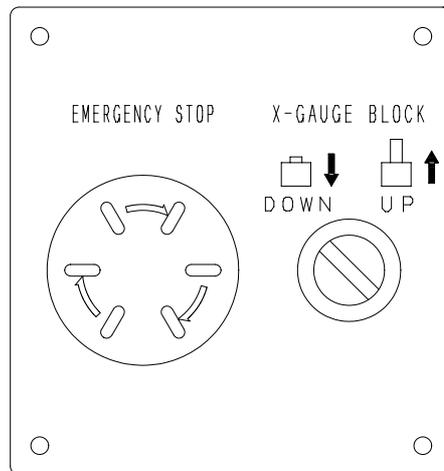
[1] EMERGENCY STOP button

Stops the operation of the machine as soon as pressed in any NC mode, and then locked.   Unlock the button by turning it clockwise, return the machine to the normal condition, and zero-return all axes before starting the machine for another operation.   The machine cannot resume the operation interrupted by the depression of the button.

[2] X-GAUGE BLOCK switch

Turned to UP to raise the X-gauge block and to DOWN to lower the X-gauge block.

SUBCONTROL PANEL "B"
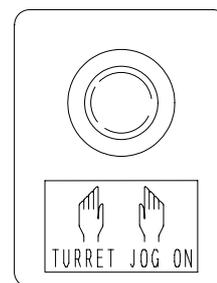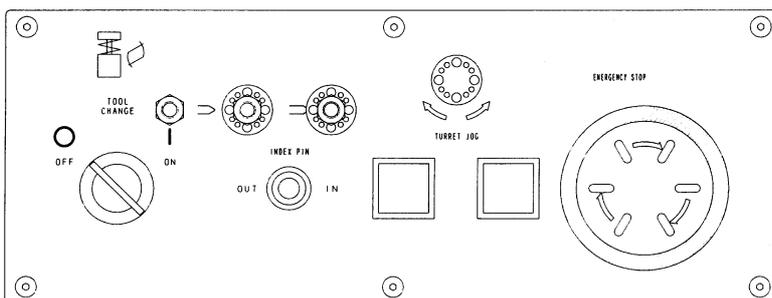
[1] TOOL CHANGE keyswitch

Turned to ON in the MANUAL mode to lock the carriage (X-axis) and carriage base (Y-axis).   The turret can be then safely rotated.   The key can be removed from the keyswitch in the ON position.

NOTE

● Never turn the switch to ON during the operation of the machine in any NC mode other than MANUAL.

[2] INDEX PIN switch, and IN and OUT lights

The switch is used to operate the turret index pins in the MANUAL mode and is disabled in other NC modes.   The pins are inserted in the turret disks by turning the switch to IN to illuminate the IN light.   The pins are withdrawn when the switch is turned to OUT to illuminate the OUT light.   Normally keep the OUT light illuminated.   The switch is spring-returned to the neutral position when it is released.

[3] TURRET JOG buttons

Used to rotate the turret in the MANUAL mode when the TOOL CHANGE keyswitch (see above) is turned to ON.   Use the left button to rotate the turret clockwise and the right button to rotate the turret counterclockwise.   The turret rotates at 3 min^{-1} (rpm).   The turret stops and indexes the nearest turret station in its rotational direction when each button is released.

The turret index pins must be out of the turret disks when using these buttons.   Press either TURRET JOG button within 0.5 sec after pressing and holding the TURRET JOG ON button (see below).

The TURRET JOG buttons are disabled in NC modes other than MANUAL.

NOTE

● Even if the tool change doors are opened or closed, the turret can be rotated by pressing the TURRET JOG ON button and either TURRET JOG button.

[4] EMERGENCY STOP button

Stops the operation of the machine as soon as pressed in any NC mode, and then locked.   Unlock the button by turning it clockwise, return the machine to the normal condition, and zero-return all axes before starting the machine for another operation.   The machine cannot resume the operation interrupted by the depression of the button.

[5] TURRET JOG ON button

Used to rotate the turret in combination with the TURRET JOG buttons (see above) in the MANUAL mode.

SUBCONTROL STAND (OPTION)
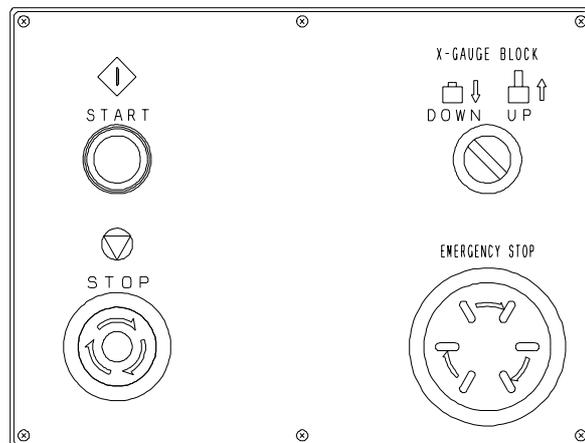
[1] EMERGENCY STOP button

Stops the operation of the machine as soon as pressed in any NC mode, and then locked.   Unlock the button by turning it clockwise, return the machine to the normal condition, and zero-return all axes before starting the machine for another operation.   The machine cannot resume the operation interrupted by the depression of the button.

[2] X-GAUGE BLOCK switch

Turned to UP to raise the X-gauge block and to DOWN to lower the X-gauge block.

[3] START button

Starts the operation of the machine when pressed in the MEMORY or MDI mode.   Also pressed to move a turret station to the tool change position using the Turret rotation display.

<u>NOTICE</u>

● When "Override" is shown on the MESSAGE display and the machine is paused, check that the worksheet is not distorted, and then press the START button.   The machine resumes the operation to punch the worksheet.
When "Dead zone" is shown on the MESSAGE display and the machine is paused, the worksheet cannot be punched by pressing the START button because one of the workclamps is also likely to be punched.

When "Dead zone" is shown, press first the PUNCHING button and then the START button to punch the worksheet.   If this procedure is performed, the machine punches where it may punch one of the workclamps.   Before performing the procedure, check the position of the workclamps.

[4] STOP button

Pressed to stop the operation of the machine and lock itself.   To unlock the button, turn it clockwise.

OTHER CONTROLS

Keyboard

| Esc key | Alphabetic keys | Delete keys | Page keys | Numeric keys |
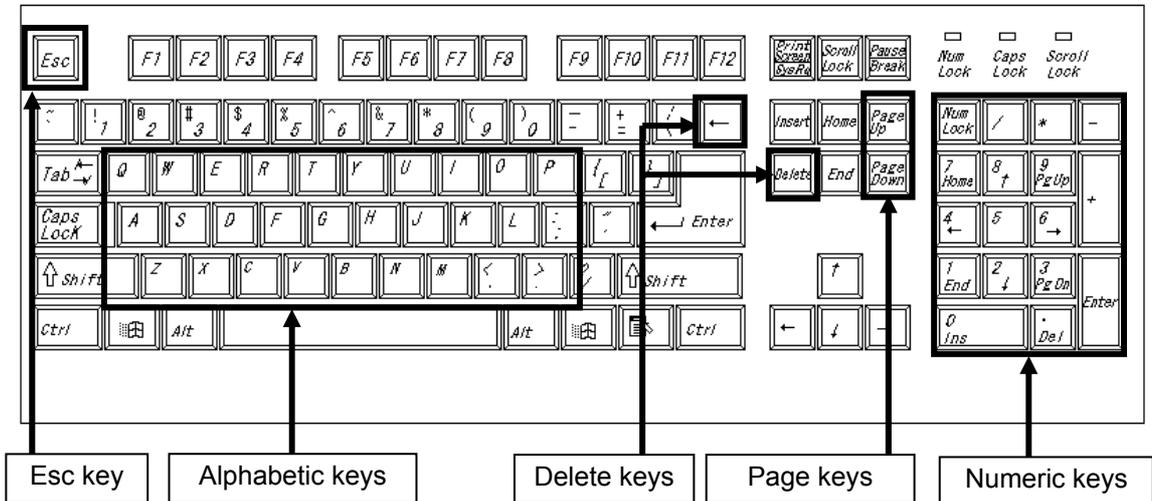
[1] Alphabetic keys

Pressed to enter alphabetic characters or symbols.

[2] Numeric keys

Pressed to enter numerals, the minus symbol (–), and the decimal point (.), among other characters.

[3] Esc key

Pressed to cancel the entry operation.

[4] Delete keys

Pressed to delete a character.

← : Deletes the character before the cursor.

Delete : Deletes the character after the cursor.

[5] Page keys

Pressed to change a display from one page to another.

Page Up : Goes to the previous page.

Page Down : Goes to the next page.

Cursor keys
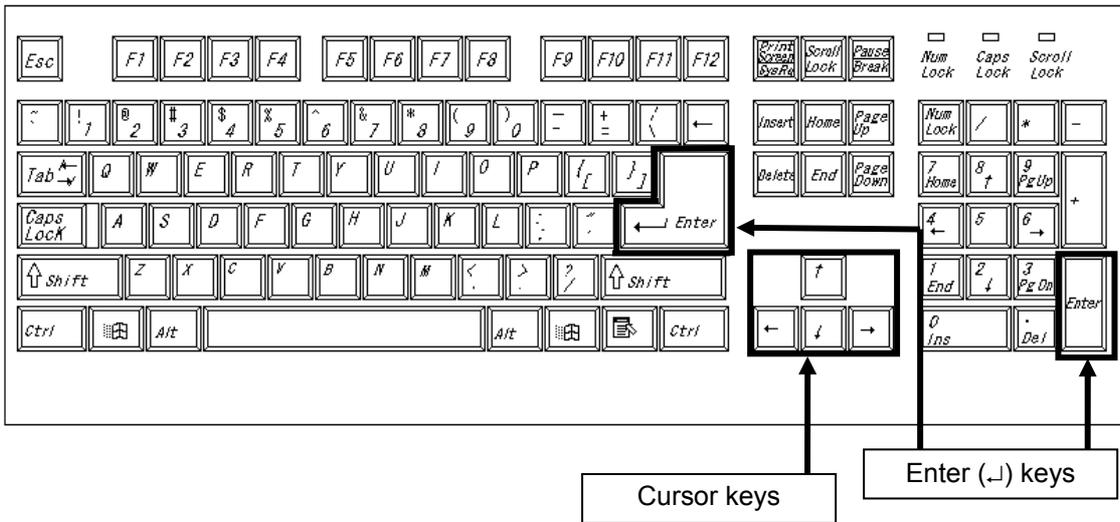
Enter (↵) keys

[6] Cursor keys

Pressed to move the cursor on the screen.

↑ : Moves the cursor up.

↓ : Moves the cursor down.

← : Moves the cursor left.

→ : Moves the cursor right.

NOTE

● When the cursor is moved after entering a value, the value is stored in memory.   Press the Esc key to cancel this entry operation.

[7] Enter (↵) keys

Pressed to store each value in memory.

Foot switch

Pressed to open and close the workclamps.   During the automatic operation of the machine, the foot switch is enabled only when the machine is stopped by a program stop command (M00) or optional stop (M01) command.

Tool balancer controls

PRESSURE ADJUSTMENT
DIAL

AIR CYLINDER

3-1/2

4-1/2

HIGH
LOW

LOW   HI

ON   I

OFF   O

SCREW

PUNCH

ON/OFF SWITCH
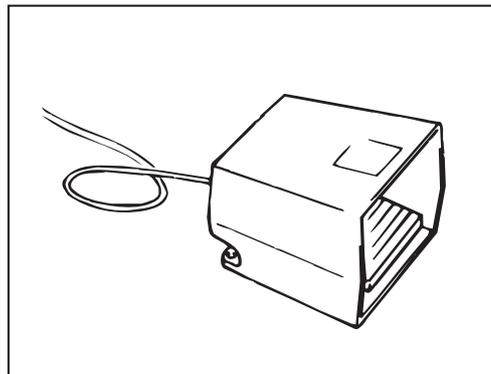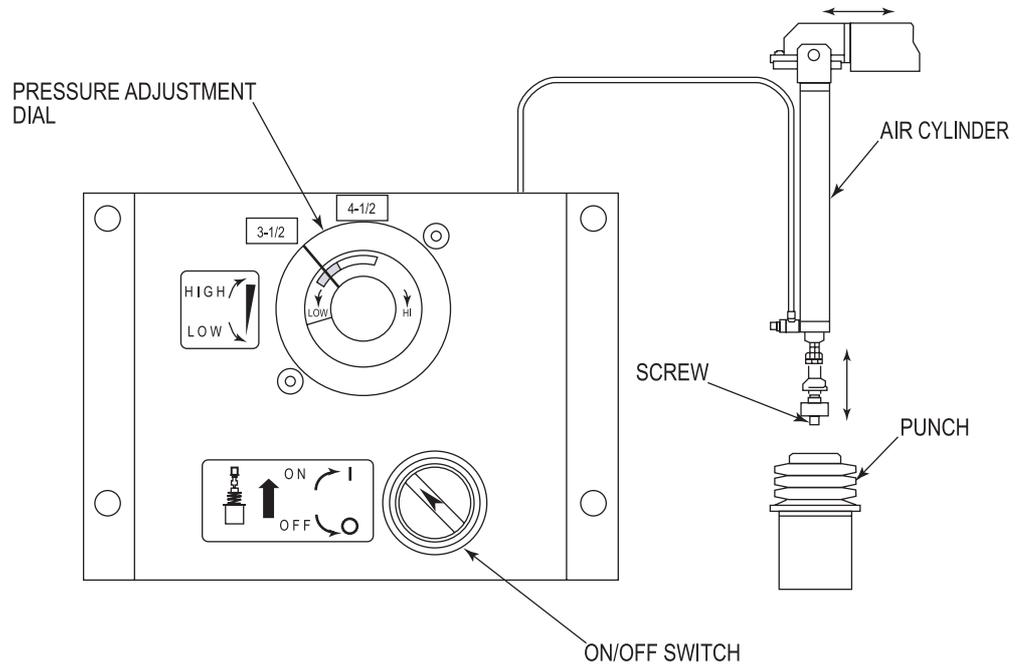
The following dial and switch are located behind the upper tool change door (see the figure above) and used to control the tool balancer.   The tool balancer supports the mass of a large-diameter (3-1/2" or larger) punch during installation or removal.

[1] Pressure adjustment dial

Used to adjust the lifting force of a large-diameter punch.   Turn the dial clockwise to increase the lifting force and counterclockwise to decrease the lifting force.

[2] ON/OFF switch

Used to support a large-diameter punch during installation or removal.

Reading workclamp position

The workclamp position is read at the start of the first program immediately after the machine is powered on.   It is not read again until:

- Operation of the workclamp clamp levers

- Emergency stop of the machine

- Manual release of the workclamps (when the optional clamp positioner is used)

- Positioning of the workclamps 50 times by the G05 command (when the optional clamp positioner is used)

Execution of any of the above operations calls for detection of the workclamp position.   In this case, the workclamp position is read at the start of the next program.

Reading of the workclamp position starts at the origin A as shown below. The carriage reads the workclamp position as it moves to the stroke end B.   The carriage returns to the origin, and the machine starts the punching operation.
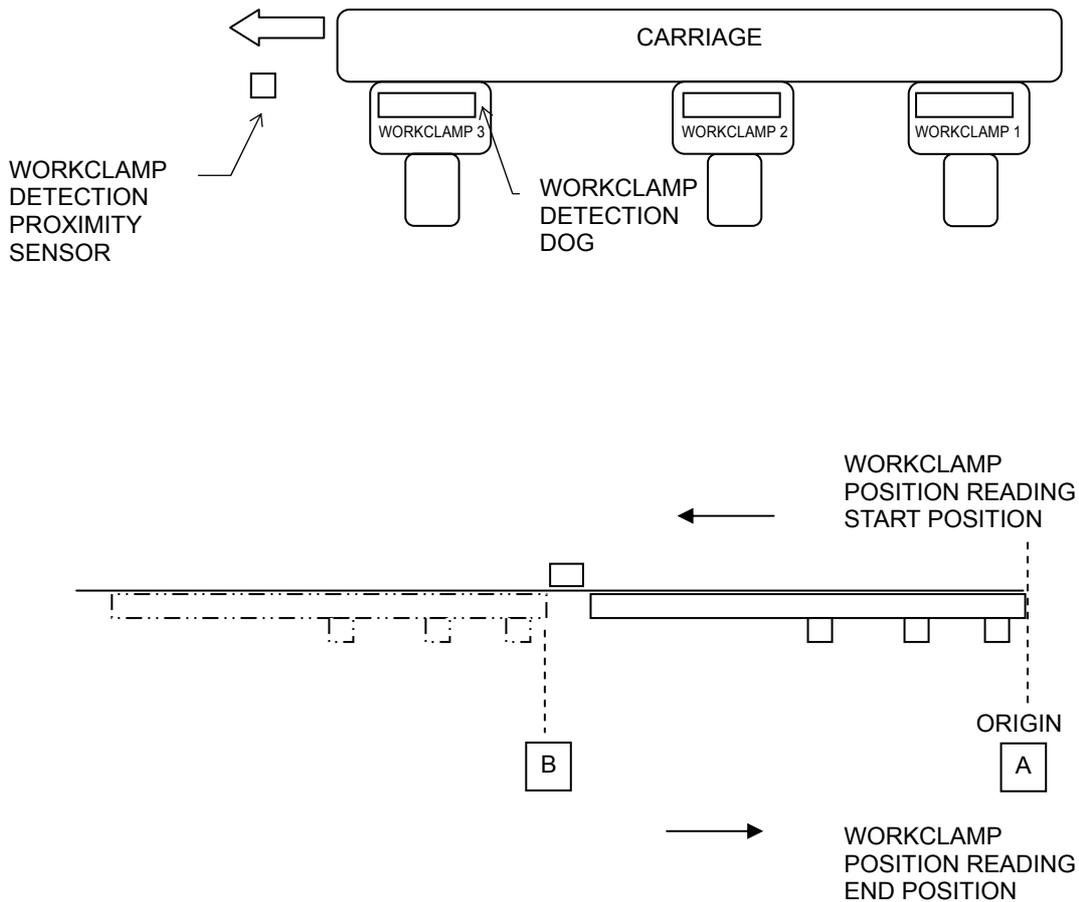
Part III

Displays

Common to EM US series

DESCRIPTION

Here are described the displays that appear on the screen after the startup of the NC unit and the zero-return of the machine.

For the procedure for starting up the NC unit and the flow of processing, refer to Part VI, Operation.

Basic operation

The machine has various buttons arranged on each display.   The buttons function when the corresponding portions on the display are pressed or touched.   Some of the buttons illuminate to indicate that they are pressed.

Entering letters and numerals

Use the accessory keyboard to enter or edit the letters and numerals on each display.

Scroll bars

One or two scroll bars appear when all data cannot be shown on one display as is the case with a file list.   The display can also be scrolled with the up, down, left and right arrows and the thumb of each scroll bar.

Cursor

When you touch the display position to which you want to move the cursor, the cursor moves to that position.

If the display has cursor buttons, press the cursor buttons to move the cursor to your desired position on the display.

The cursor moves also when the display is scrolled with the scroll bar or bars.

Composition of displays

BASIC DISPLAY COMPOSITION

The basic screens displayed on the LCD are PRE-EDIT, SCHEDULE, PROGRAM, RESULT, UTILITY, MESSAGE, COND., and MAINT.

The basic display composition of the common components is as shown below.

Display selection buttons

CURRENT POS. button

SW. PANEL button

Data edit area

Processing status display area 1

Processing status display area 2
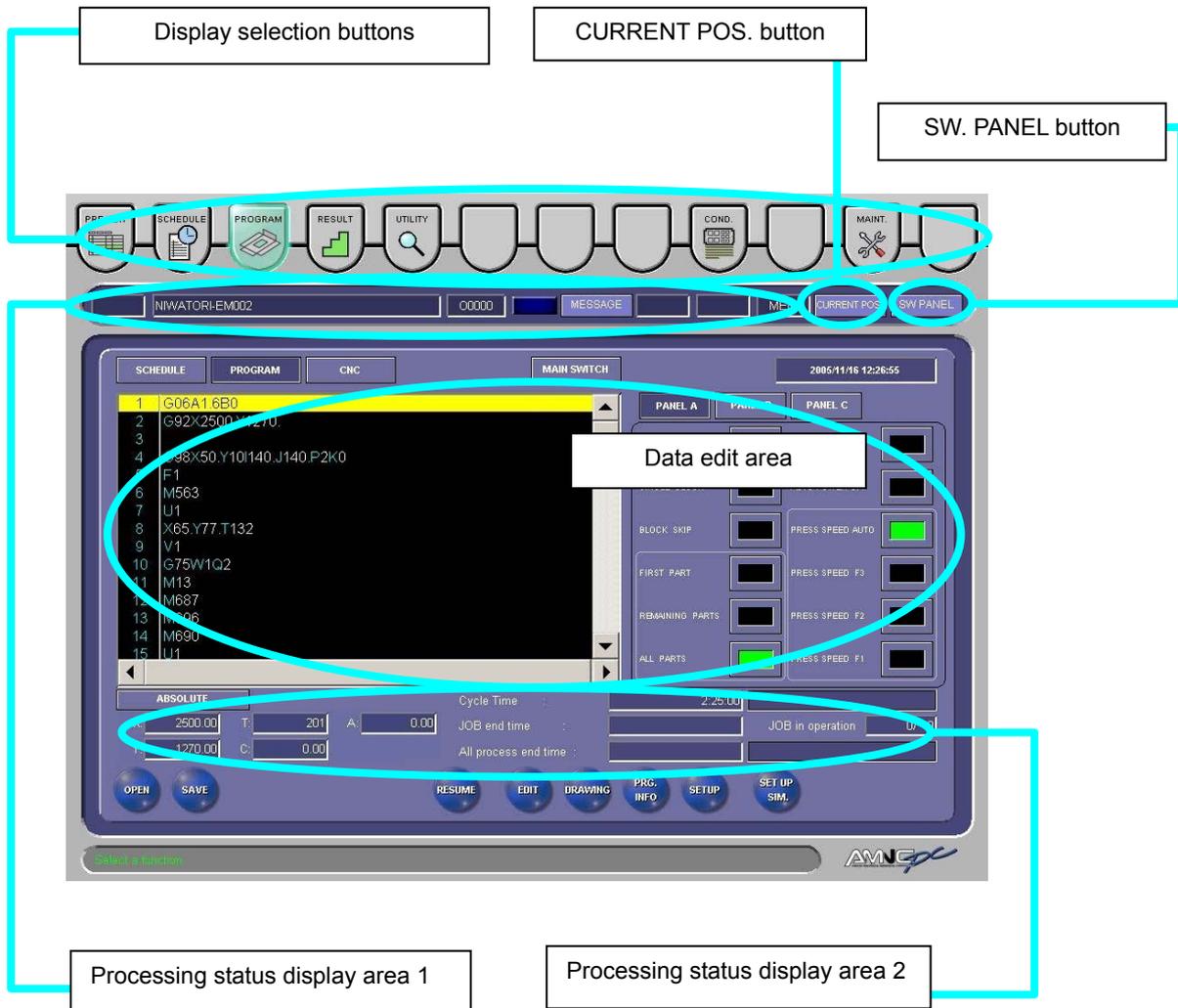
DISPLAY SELECTION BUTTONS

There are eight displays: PRE-EDIT, SCHEDULE, PROGRAM, RESULT, UTILITY, MESSAGE, COND. (processing condition), and MAINT. (maintenance).   Press the corresponding button to change to each display.
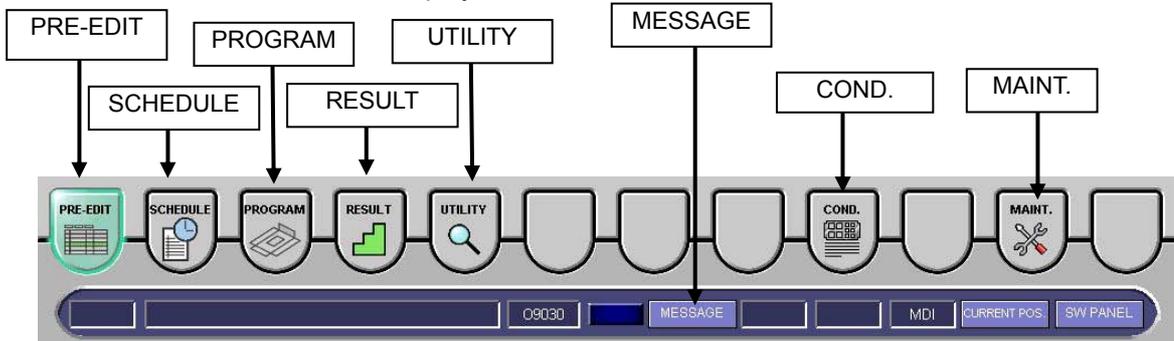
I: PRE-EDIT (background)

Pressed to open the PRE-EDIT display to create and edit the next program or schedule while the machine is operating.   You can also check the setup and check the part by drawing it before operating the machine.

II: SCHEDULE

Pressed to open the SCHEDULE display to read a schedule, create a
schedule, and set a start job or end job.   You can also check the setup
and check the part by drawing it.

III: PROGRAM

Pressed to open the PROGRAM display to show a program.   You can
also check the setup and check the part by drawing it.
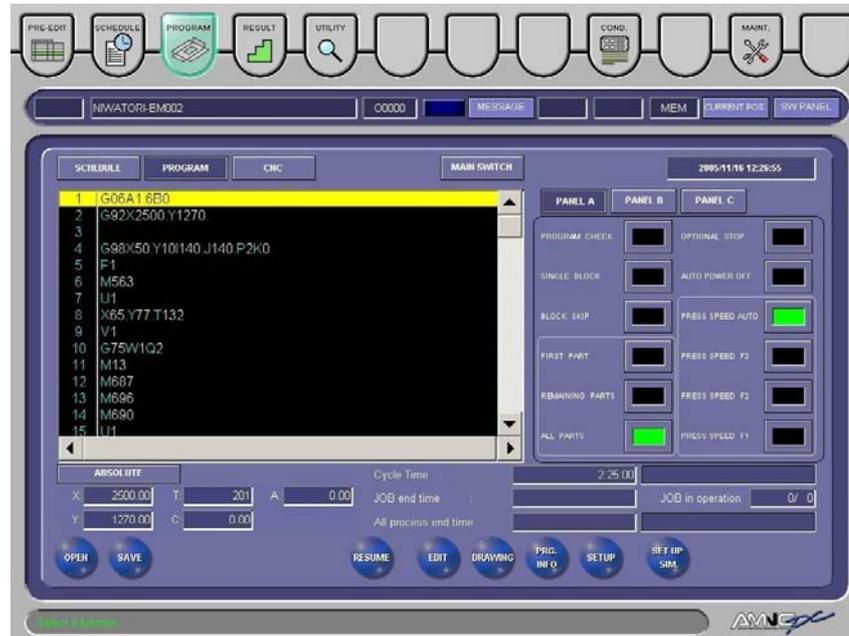
IV: RESULT

Pressed to open the RESULT display to show the actual processing results.   The result file can be output in CSV format.

V: UTILITY

Pressed to open the UTILITY display to run one of the registered macro programs.

VI: MESSAGE

Pressed to open the MESSAGE display to show alarms and warnings and their logs.

VII: COND.

Pressed to open the processing condition display to set the press pattern parameters (M-codes) and the time zone selection. Either "list input" or "guide input" can be selected as the method of setting the press pattern parameters. Trial punching during the setup of the press pattern parameters can also be performed on this display.

VIII: MAINT.

Pressed to open the maintenance display to set the following items:

USER SETTINGS

Sets the operation, display, drive, line, and time.

APPLICATION SETTINGS

Sets check items by setup simulation software.

DATA INPUT AND OUTPUT

Copies and moves a program or programs between media.

HIT COUNT MANAGEMENT

Sets the hit count and tool life by turret station.

> **NOTE**
>
> ● If the machine is equipped with the multi-tap device option, the hit count and tool life of each tap can also be set on this display.

CNC MAINTENANCE

Manages program setting data, macro variables, DNC parameters, and CNC settings.

VERSION INFORMATION

Shows the version information of each software.

E-MAIL NOTICE FUNCTION

Sets the receiver address, send time, and other particulars of e-mail.

INSPECTION

Sets the inspection period of a given inspection item (e.g., lubrication or filter cleaning).

BACKUP SCHEDULER

Sets the data to be backed up and the backup interval.

EXTERNAL IO SETUP

Makes the settings for connecting an external communication device through the RS232C interface.

● The port that can be set on the External IO Setup display is the PANEL i
serial port but not the CNC unit serial port.

OVERALL MENU

PRE-EDIT
- OPEN
- SAVE
- EDIT
- DRAW
- SETUP
- SIM.
- TRANS JOB
- SWITCH
- COPY
- DELETE
- DELETE ALL
- MOVE DOWN
- MOVE UP
- ADD
- CONFIRM
- PRG.INFO

SCHEDULE
- Mode Switch
- OPEN
- SAVE
- EDIT
- DRAW
- SETUP
- SIM.
- START JOB
- SWITCH
- COPY
- PASTE
- DELETE
- DELETE ALL
- MOVE DOWN
- MOVE UP
- SCHEDULE SAVE
- SELECT ALL
- PRG.INFO

PROGRAM
- Mode Switch
- OPEN
- SAVE
- RESUME
- EDIT
- DRAWING
- SETUP
- SIM.
- SW PANEL
  - PANEL A
    - PROGRAM CHECK
    - SINGLE BLOCK
    - OPTIONAL STOP
    - AUTO POWER OFF
    - Multiple part mode
    - Press Speed
      - All
      - Auto
      - First
      - F3
      - Others
      - F2
      - F1
  - PANEL B
    - OPTION
  - PANEL C
    - OPTION
- PRG.INFO

RESULT
- SEARCH
- FILE OUTUP
- DELETE
- DELETE ALL
- UPDATE

UTILITY
- G50
- RETURN 2ND MACHINE POSITION
- G00

COND.
- STD INPUT
- GUIDE INPUT
- TOOLING DATA
- AUTO TIMER
- RESTORE

MENT.
- MAINTENANCE 1
  - DATA INPUT AND OUTPUT
    - COPY
    - MOVE
  - HIT COUNT MANAGEMENT
    - PUNCH
    - TAP
  - USER SETTINGS
    - OPERATION SETTINGS
    - SELECT VIEW
    - SPECIFY DRIVE
    - AUTO TIMER
    - SYSTEM MANAGER
  - CNC MEINTENANCE
    - PROGRAM MANAGE
    - SETTING
    - MACRO
    - DNC PARAMETER
    - CNC SET
  - APPLICATION SETTINGS
    - SETUP
  - VERSION INFOMATION
  - INSPECTION
  - BACKUP SCHEDULER
    - SET
    - MANUAL
      - SAVE
      - PRESERVE
      - DELETE
  - E-MAIL NOTICE FUNCTION
    - START
    - SETUP
    - MAIL
  - EXTERNAL IO SETUP
- MAINTENANCE 2

DISPLAY AREA
- Message
- CURRENT POS.
- PANEL A
  - PROGRAM CHECK
  - SINGLE BLOCK
  - OPTIONAL STOP
  - AUTO POWER OFF
  - Multiple part mode
  - Press Speed
    - All
    - Auto
    - First
    - F3
    - Others
    - F2
    - F1
- PANEL B
  - OPTION
- PANEL C
  - OPTION

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AMADA

DESCRIPTION OF DISPLAYS

PROCESSING STATUS DISPLAY AREA 1

Processing status display field

Displays the processing status based on the NC status.

- STRT: Displays the execution of a program.
- HOLD: Displays the stop of automatic operation in the middle of execution of a block.
- STOP: Displays the stop of automatic operation at the completion of execution of a block.

Running program display field

Displays the name of the program being run or on standby.

Operating status display field

Displays the operating status of the machine.

 Operating: Blue

 Warning produced: Yellow

 Alarm produced: Red

MESSAGE button

Pressed to open the MESSAGE display.

This screen displays the alarms and historical log data.

● When an alarm or warning occurs, the MESSAGE display automatically appears.

CURRENT POS. button

Opens the Current Position display.   Press the ABS, MACHINE, REL, REMAIN, or TOTAL button to change the coordinate values of the axes to be displayed.

Current Position

ABS	MACHINE	REL	REMAIN	TOTAL

X	2500.00	A	0.00
Y	1270.00		
T	220		
C	0.00		

CURRENT POS.   I/O   PROCESS QTY.   BACK
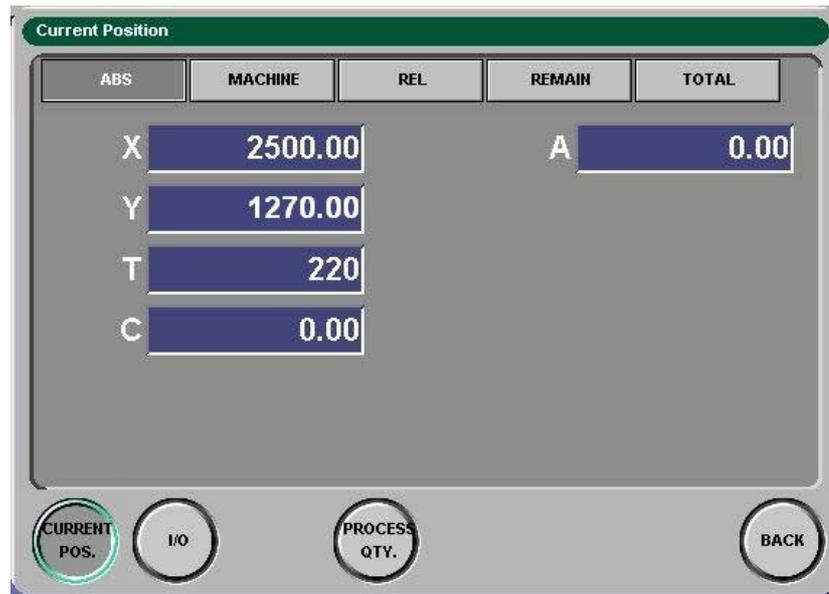
I/O button

Shows the status of the set address in real time.

Current Position

SETTING 1	SETTING 2	SETTING 3	SETTING 4	SETTING 5	SNAPSHOT

ADDRESS	Data length	Type	Data
R716	DWORD	DEC_SIGN	10000
G10	BYTE	BIN	11101111
G11	BYTE	BIN	11011000
X6	BYTE	BIN	00000100

CURRENT POS.   I/O   PROCESS QTY.   BACK

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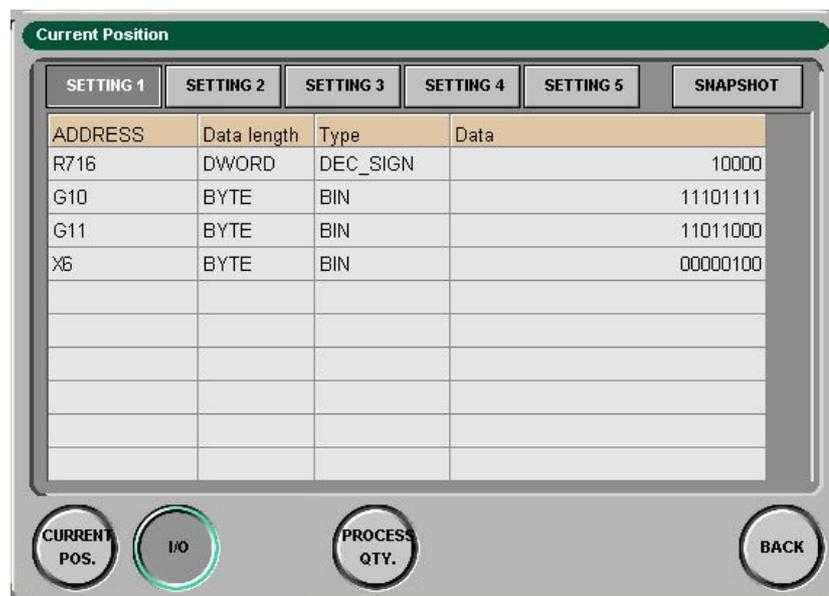
SNAP SHOT button

Outputs the currently displayed I/O status in a CSV file.
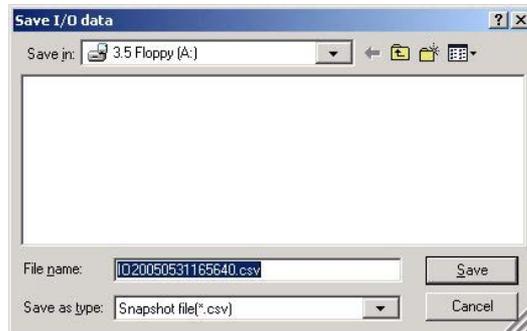
PROCESS QTY. button

Shows the current scheduled quantity and the actual quantity.
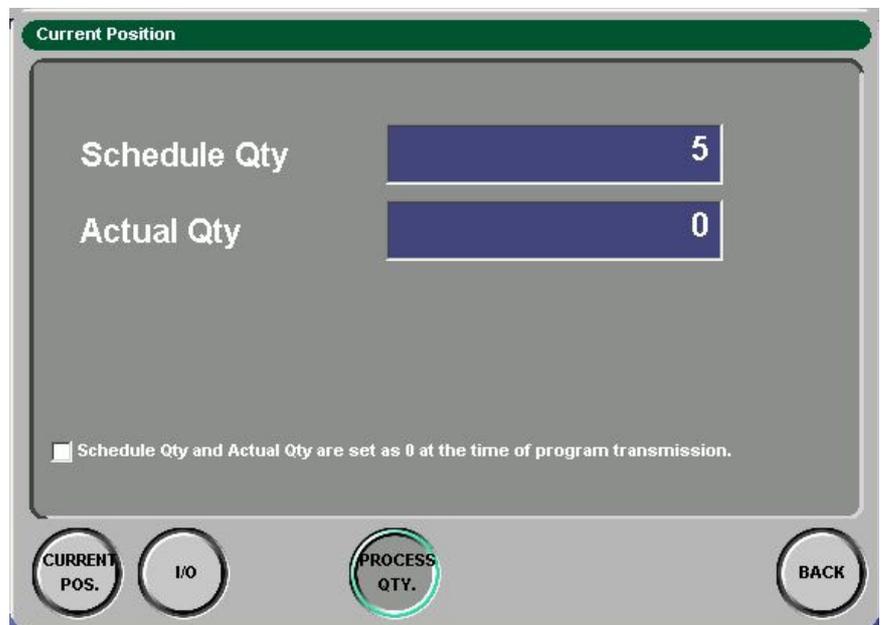
Schedule Qty: The scheduled quantity is displayed.   Input a value and press the ENTER key.

Actual Qty: The actual quantity is displayed.   Input a value and press the ENTER key.

Schedule Qty and Actual Qty are set as 0 at the time of program transmission.: When executing downloading a program in the PROGRAM automatic operating mode, the Schedule Qty and Actual Qty fields are set to 0, if this check box is checked when a search is executed with keys.

When the actual quantity reaches the scheduled quantity, the following message is displayed.   To clear the message, set the scheduled quantity to 0 or set the actual quantity to a value smaller than the scheduled quantity.

NOTE

● The PROCESS QTY. button is not displayed in any automatic operation mode other than PROGRAM.

● The following message appears if the ENTER key is pressed when the memory protect function is active.
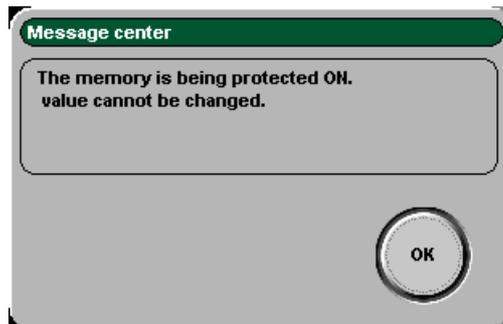
NC status display fields

1: Displays "Mcode" when an M-code is being run.

NOTE

● The M-code is displayed while it is being run.
  Example: M194

2: Displays "EMG" when the machine is in an emergency stop condition.

3: Displays the current NC mode.

   MEM: MEMORY mode   MDI: MDI mode

   JOG: MANUAL mode   EDIT: EDIT mode

   REF: RETRACT mode   RMT: DNC mode

SW. PANEL BUTTON

SW. PANEL button

Pressed to cycle through the following buttons required for the operation of the machine.

NOTE

● The types of buttons to be displayed vary with the specifications of the machine.

PROGRAM CHECK button

Pressed and illuminated to enable the program check function.   The machine does not operate while the program is being checked.   For details, refer to "Checking program" in Part VI, Operation.

Pressed again and extinguished to disable the program check function.

SINGLE BLOCK button

Pressed and illuminated to enable the single block operation of the machine.

Each time the START button on the main control panel is pressed in the single block operation, the machine executes one block of the program and then stops.

Pressed again and extinguished to disable the single block operation of the machine.

● If multiple punching strokes are commanded as for pattern punching in the single block operation, the machine stops after each punching stroke. When the "G68, G69" nibbling commands are specified, the machine stops after executing all punching strokes from the start point to the end point.

BLOCK SKIP button

Pressed and illuminated. When the program is started, the machine ignores each block with a slash (/) at the beginning and goes to the next block.

BLOCK SKIP

Pressed again and extinguished. The machine executes blocks with a slash (/) at the beginning without ignoring them.

Multiple-part punching setup buttons

Press one of the multiple-part punching setup buttons to select the multiple-part punching function you want to perform.

The button illuminates when pressed.

Press the button again to extinguish it.

FIRST PART

REMAINING PARTS

ALL PARTS

Button condition	Description
All extinguished	Program does not use multiple-part punching function (machine does not punch multiple parts from one worksheet)
FIRST PART button illuminated	Machine punches only first of multiple parts programmed
REMAINING PARTS button illuminated	Machine punches second and subsequent parts
ALL PARTS button illuminated	Machine punches all parts

FIRST   REMAINING   ALL
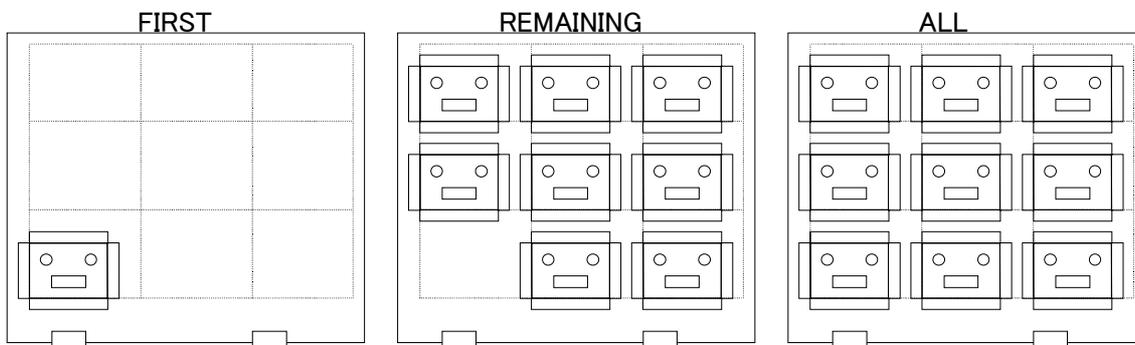
● Before starting a multiple-part punching program, press and illuminate one of the multiple-part punching setup buttons.   An alarm occurs if all buttons are extinguished.   Before starting a non-multiple-part punching program, press and extinguish all buttons.   If one of the buttons is illuminated, the program cannot normally run.

● The part or parts to be processed can be drawn by the drawing function according to the processing method selected with a multiple-part punching setup button.

OPTIONAL STOP button

Pressed and illuminated.   When the program is started, the machine pauses each time "M01" (optional stop command) is read.

When the machine pauses, press the START button on the main control to resume its operation.

Pressed again and extinguished.   When "M01" is read, the machine ignores it and continues to operate.

AUTO POWER OFF button

Pressed and illuminated to enable the automatic power-off function.

Pressed again and extinguished to disable the automatic power-off function.

The button changes to flashing after the program is completed, and the power of the NC unit turns off 15 min later.

If the machine is not automatically operating, the power of the NC unit can be turned off 2 min later after the button is pressed and held for 2 sec or more.

Button illuminated: The automatic power-off function is enabled

Button flashing: The power of the NC unit turns off 15 min after the start of flashing.

● This function applies only to a standalone machine.

● For the line specification, refer to the operator's manual of the line.

● This function turns off the power of the NC unit alone and does not trip the machine circuit breaker.

● If the machine enters an alarm or stop condition during its operation, the power of the NC unit automatically turns off 15 min later.

● The program can be restarted even if the button is flashing.   The button changes from flashing to steady when the program is restarted.   The button changes back to flashing after the program is completed, and the power of the NC unit turns off 15 min later.

PRESS SPEED buttons

Select the press speed
(punching speed) during
the automatic operation of
the machine.
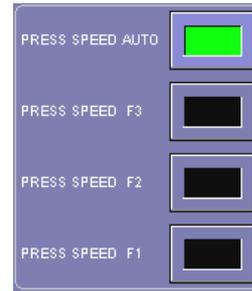
Press and illuminate one of the PRESS SPEED buttons to select one of
the following functions:

• F1 to F3: The worksheet is punched at one of the three press speeds
(high speed F1, medium speed F2, and low speed F3).

• AUTO: The press speed is automatically set to suit the worksheet
material and thickness and the tool size.

JAMMING SENSOR button (option)

Pressed and illuminated to
enable the worksheet bow
detection (jamming sensor)
function.

Pressed again and extinguished to disable the worksheet bow detection
(jamming sensor) function.

```
        NOTE
```
● The button is not displayed unless the option is set.

STRIP MISS button

Pressed and illuminated to
enable the stripping failure
detection function.

The machine pauses when the punch does not normally rise after
punching.   Check the punch and worksheet.   If there is no problem,
press the START button on the main control panel to resume the
automatic operation of the machine.

Pressed again and extinguished to disable the stripping failure
detection function.

```
        NOTICE
```
● Usually, press and illuminate the STRIP MISS button to enable the stripping
   failure detection function.   When the function is disabled, the machine does
   not pause even if the punch does not normally rise after punching, with the
   result that the machine and tool (punch or die) may be damaged.

CLAMP DETECTION button (option)

Pressed and illuminated to
enable the worksheet
clamp detection function.

Pressed again and extinguished to disable the worksheet clamp
detection function.

REMOTE button

Pressed and illuminated to
enable the DNC operation
when the automatic
operating mode is CNC.

CHUTE SENSOR button (option)

Pressed and illuminated to
enable the work chute
sensor function.

Pressed again and extinguished to disable the work chute sensor
function.

AIR BLOW V OIL LOWER INTERLOCK button (option)

Pressed and illuminated to
enable the air blow oil
lower interlock function.

Pressed again and extinguished to disable the air blow oil lower
interlock function.

PROCESSING STATUS DISPLAY AREA 2

Coordinate system display selection buttons

These buttons are used to select the mechanical coordinate system
and absolute coordinate system for the coordinates.

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Cycle Time

Displays the operating time for the current program.

JOB end time

Displays the scheduled end time for the current job.

All process end time

Displays the scheduled end time for the current scheduled operation.

Program indicator (Green)

Displays the progress of the program with respect to the scheduled processing time and illuminates yellow to indicate the stop of the program.

NOTE

● The program indicator does not appear if the scheduled processing time is not included in the program information.
● The scheduled processing time may be different from the actual processing time.

JOB in operation

Displays the current number of processing jobs with respect to the total number of jobs.
(Number of processed jobs/total number of jobs)

Schedule indicator (Orange)

Displays the current number of processed worksheets with respect to the total number of worksheets scheduled to be processed.

DATA EDIT AREA

Used to create and edit schedules and programs.

C					PrgName	Prcss Qty	Actual#	Def. Qty.	Op.Status	Material Name	
1					ALLSTATION	1	0	0	Unlaunch	SUS1.0	
2					HTT-B-SPC	1	0	0	Unlaunch	SPC1.6	
3					YHCR-GM-SPC	1	0	0	Unlaunch	SPC1.6	
4					BOX-011-03-SPC	1	0	0	Unlaunch	SPC1.6	

C button

Located at the upper left of the list and changes in color to indicate if there are any items selected in the list.   Pressed to deselect such items.
Enabled for all lists.

OPEN button

Calls a necessary program or programs to the data edit area.

Pressed to open the OPEN display.

Media selection buttons

SWITCH button
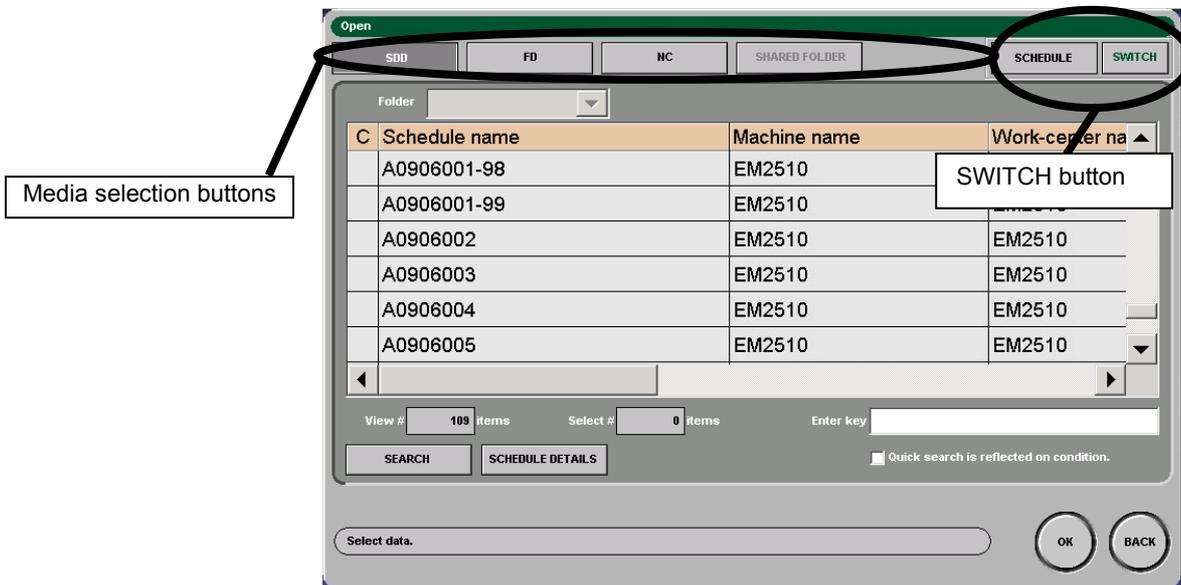
Select the call-from media, select the necessary program or programs from a list of programs contained in the call-from media, and press OK.

NOTE

● Multiple programs can be called to the data edit area when the screen is the PRE-EDIT or SCHEDULE display.

● When the automatic operating mode is PROGRAM, the program or programs cannot be called unless the MEMORY button on the main control panel is pressed and illuminated.

● When the program or programs are called from the PROGRAM display, the SWITCH button is not displayed.

SDD:	Lists the programs saved in the SDD system.
FD:	Lists the programs saved in the floppy disk.
NC:	Lists the programs saved in the NC unit.
SHARED FOLDER:	Lists the programs saved in the specified share folder.
SEARCH:	Searches a program list for a program or programs.
SCHEDULE DETAILS:	Shows the contents of each schedule. Select the schedule, and press the button. Enabled when the schedules are listed.
SWITCH:	Changes the listed data between the programs and schedules.
Folder:	Selects the folder to be referred to from the call-from media.

● The folders cannot be selected during schedule operation.

● When the media selection FD button is pressed, this field is changed from Folder to FD type only if the Differentiate FDD media field is set to Manual and the "Select media when selecting FD" check box is checked on the SELECT VIEW display, opened by clicking the SELECT VIEW tab, of the User settings display, a maintenance display.
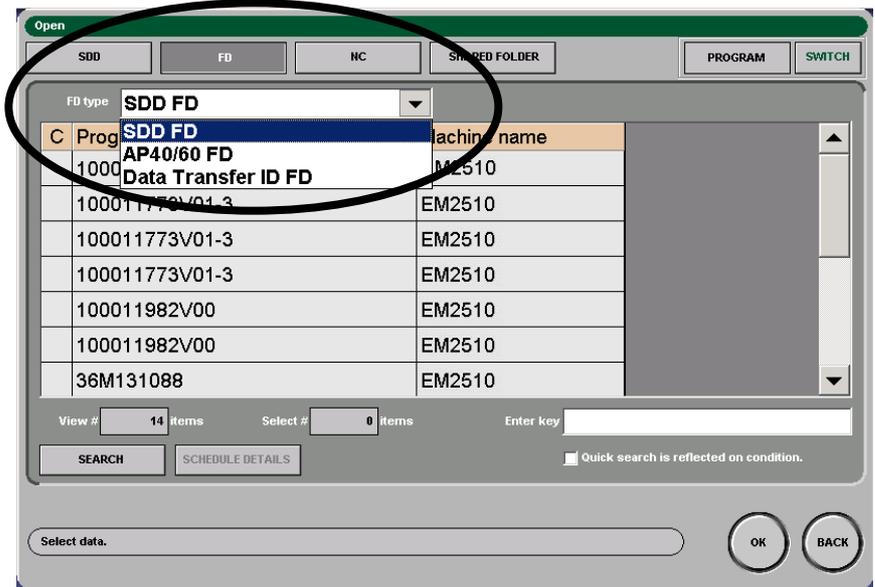
Enter Key field: The program data are searched when a program name is inputted and the Enter key is pressed.   When a barcode is read with the bar code reader, the program name is displayed.

Quick search is reflected on condition:
                          When this check box is checked, the key-entered program search condition is reflected in the program name search field of the display opened by pressing the SEARCH button on the Open display.

● The SDD system is the data management system composed of Amada's automatic programming unit AP100 and data server ASIS100PCL.

SAVE button

Saves the program created or edited on the screen.

Select the program to save, and press the button to open the Save data display.

RENAME:	Changes the program name.
DELETE:	Deletes the program without saving it.
SDD:	Saves the program in the SDD system (select the folder in which the program is saved).
NC:	Saves the program in the NC unit (select the folder in which the program is saved).
NEW:	Creates a new folder in the NC unit.
FD:	Saves the program in the floppy disk.

NOTE

● The following field is displayed to allow the selection of the save-to location only when the FD button is pressed after the Differentiate FDD media field is set to Manual and the "Select media when selecting FD" check box is checked on the SELECT VIEW display, opened by clicking the SELECT VIEW tab, of the User settings display, a maintenance display.

SHARED FOLDER: Saves the program in the specified share folder.

NEW: Creates a new share folder.

Confirm overwrite: Confirms whether or not to overwrite the program when saving it.

NOTE

● Check the Confirm overwrite check box to confirm whether or not to overwrite a program of the same name with the new program when saving the new program.

● Multiple programs can be selected for saving on the PRE-EDIT and SCHEDULE displays.

● For specifying the share folder, refer to "Specify drive display" on page III-75.

Select where to save the program, and press OK on the Save data display to open the Confirm saved data display.
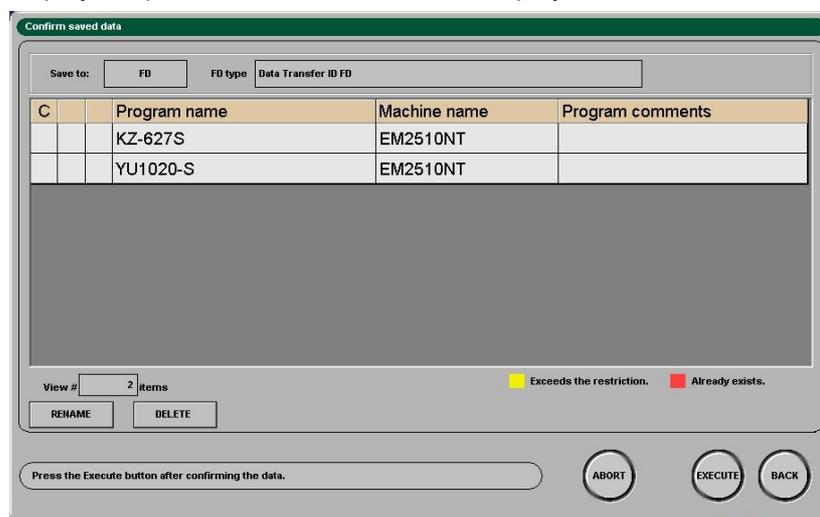
C		Program name	Machine name	Program comments
		KZ-627S	EM2510NT	
		YU1020-S	EM2510NT	

Confirm saved data

Save to: FD   FD type: Data Transfer ID FD

View # 2 items

☐ Exceeds the restriction.   ☐ Already exists.

RENAME   DELETE

Press the Execute button after confirming the data.

ABORT   EXECUTE   BACK

Check the name of the program, and press EXECUTE.

RENAME: Changes the program name.

DELETE: Deletes the program without saving it.

BACK: Returns to the Save data display.

EXECUTE: Saves the program.

ABORT: Stops saving the program.

EDIT button

Allows the editing of the program called to the data edit area.

Select the program to edit, and press the button to open the EDIT display.

For details of operation on the display, refer to Part IV, Program Management.
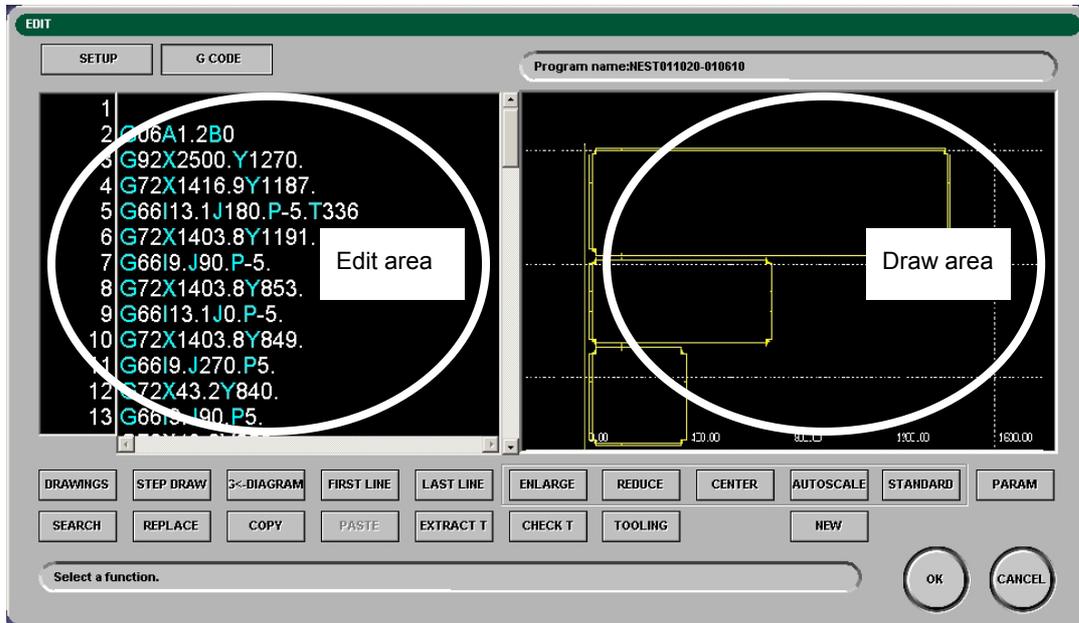
DRAWING button

Draws a part according to the program called to the data edit area.

Select the program to use for drawing the part, and press the button to open the Confirm drawing display.

There are the following buttons on the Confirm drawing display:

ENLARGE

Enlarges the figure drawn.

Press the button, and select the portion of the figure to expand.

REDUCE

Reduces the figure drawn.

Press the button to reduce the figure as referenced to the center of the display.

CENTER

Changes the display position.

Press the button, and select the portion of the figure to show as the center of the display.

AUTOSCALE

Draws a figure on an automatic scale.

STANDARD

Draws a figure in the reference position.

PARAM

Sets the drawing conditions like color.
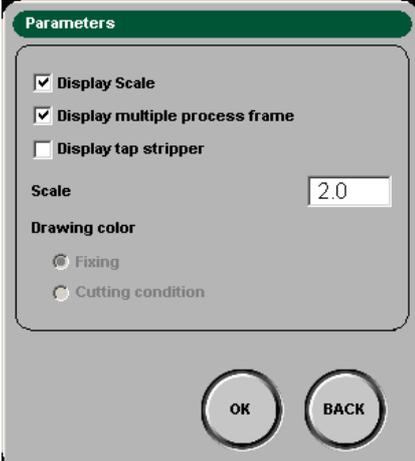
Parameters

☑ Display Scale

☑ Display multiple process frame

☐ Display tap stripper

Scale   2.0

Drawing color

◉ Fixing

○ Cutting condition

OK   BACK

BACK

Returns to the previous display.

PRG. INFO button

Displays the setup (processing) information for the selected program and the information on the selected tools.

TOOLING button

Displays the used tool list.

BACK button

Quits the Program Information display.

NOTE

● Program information is displayed only on the Program Information display. Edit the setup conditions on the Edit display.

SETUP button

Opens the TOOL INSTALLED SCREEN or LAYOUT SCREEN display to check the tools installed in the turret.

TOOL INSTALLED SCREEN display

TOOL EXCHANGE

Select the T-number line for the tool to be changed, and press the button to open the Turret rotation display.

Press and illuminate the MEMORY button and START button on the main control panel to move the selected turret station to the tool change position.

⚠ WARNING	● Before changing the tool, turn the SAFETY DEVICE keyswitch on the main control panel to SETTING.

SAMPLING

Lets the NC unit memorize the fact that the tool is removed from the selected turret station.

INS./EXC.

Lets the NC unit memorize the fact that a new tool is installed in the selected turret station.

Select the T-number, and press the button.

TOOL INSTALL

Opens the TOOL INSTALLED SCREEN display, and lists the tools installed in the turret.

LAYOUT

Opens the LAYOUT SCREEN display, and shows the tool installation conditions by using the turret diagram.

BACK

Returns to the previous display.

LAYOUT SCREEN display
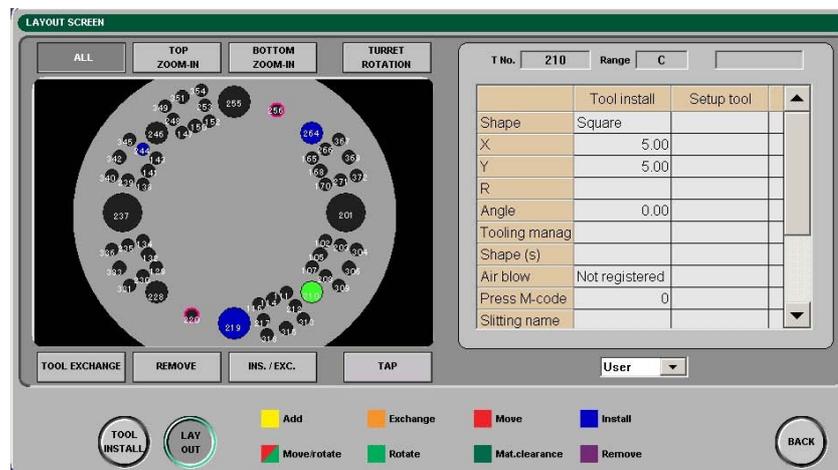
TOOL EXCHANGE

Refer to "TOOL INSTALLED SCREEN display".

SAMPLING

Refer to "TOOL INSTALLED SCREEN display".

INS.／EXC.

Refer to "TOOL INSTALLED SCREEN display".

ALL

Shows the entire turret diagram.

TOP ZOOM-IN

Shows the upper part of the turret diagram enlarged.

BOTTOM ZOOM-IN

Shows the lower part of the turret diagram enlarged.

TURRET ROTATION

Rotates the turret diagram clockwise.

TAP

Shows the tap layout diagram.
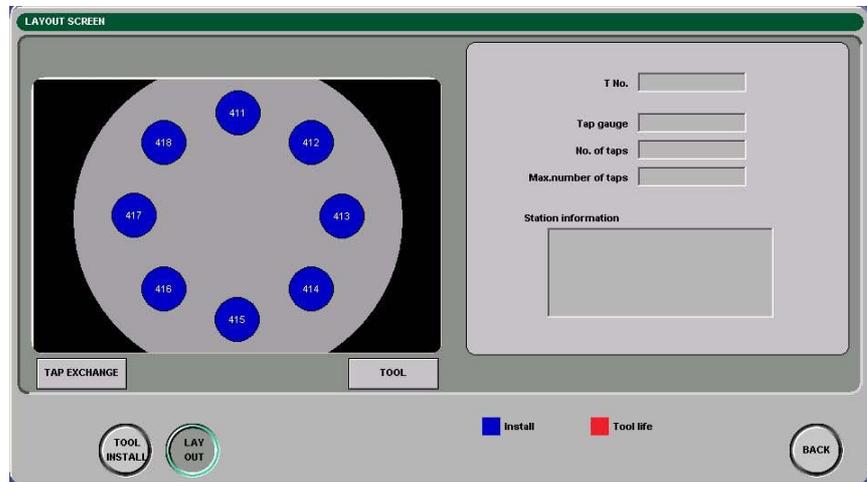
TOOL

Shows the tool layout diagram.

TAP EXCHANGE

Shows the tap layout diagram.

To move the necessary tap station to the tool change position, press the necessary station in the tap layout diagram, and press and illuminate the MEMORY button and START button on the main control panel.

TOOL INSTALL

Refer to "TOOL INSTALLED SCREEN display".

LAYOUT

Refer to "TOOL INSTALLED SCREEN display".

BACK

Refer to "TOOL INSTALLED SCREEN display".

SIM. button

Calculates setup for all programs and show the results.   (Setup simulation)

Setup marks

	Tool setup to be made
	Material change setup to be made
	Clamp position change setup to be made

Select a part given the setup mark to show the SETUP MAIN display.

Select the item you want to check, and press OK.

NOTE

● Usually, press the SIM. button to open the setup display if a setup is necessary.

NOTE

● The color of the item button shows setup information as follows:

　Red:　　A setup is to be made.

　Yellow:　Setup calculations are being made.

　Gray:　　No setup is necessary, or setup calculations are completed.

● The setup simulation is not effective unless the Tool arrangement and Work/clamp arrangement check boxes on the APPLICATION SETTINGS (Arrangement) display are checked.

TOOL USED SCREEN display

Press the setup mark for tool setup to be made in the data edit area or press the TOOL button on the SETUP MAIN display to open the TOOL USED SCREEN display. Determine the tool setup according to the setup instructions.

TOOL EXCHANGE

Select the T-number for the tool to be changed, and press the button to open the Turret rotation display.

Press and illuminate the MEMORY button and START button on the main control panel to move the selected turret station to the tool change position.

⚠ WARNING	● Before changing the tool, turn the SAFETY DEVICE keyswitch on the main control panel to SETTING.

SETUP TOOL

Shows only the tool whose setup is necessary.

TOOL USED

Shows all tools to be used.

SPECIAL DRAWING

Shown only when the machine is connected to the SDD system.   The tool can be specially drawn only if its shape is "special", "forming", or "triangle".   If its shape is registered in the SDD system, the Special model drawing window opens.
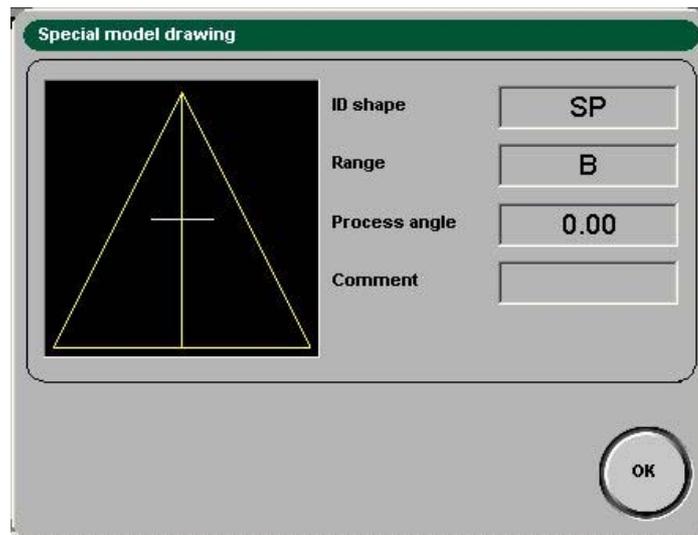
T NUMBER CHANGE

The program can be changed for the tool shown in the "Move" color on the TOOL USED SCREEN window.

T NUMBER CHANGE SCREEN

NC data and tool usage data will be amended.
Change the T number shown below?

"If okay to change$ press the OK button."

Program 318 → Program 372

Turret 372 Turret 372

OK   BACK
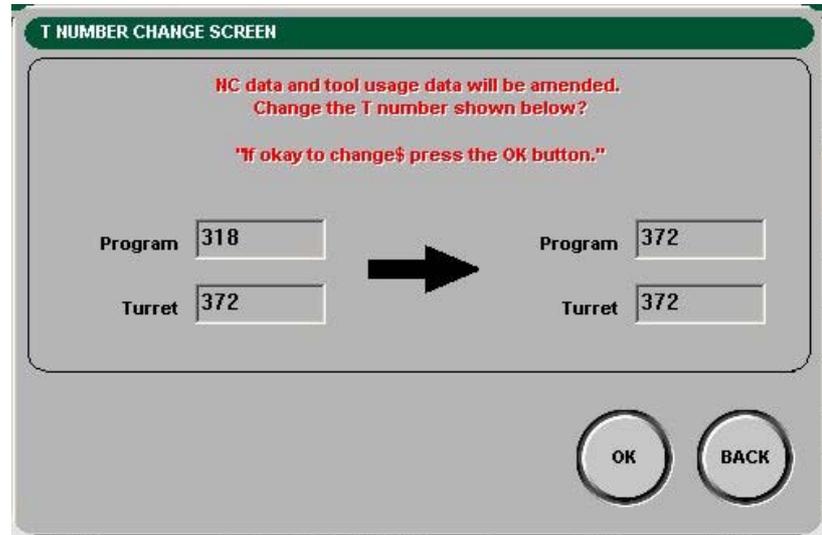
NOTE

● The T number of the program cannot be changed by pressing the OK button on the T NUMBER CHANGE SCREEN window.   Press the OK button on the Setup Main display to change the T number of the program.

MOVE > ADD

Select the tool shown in the "Move" color, and press the button to change its setup to add or exchange (exchange when the tool is installed in a turret station) and register the change.   Or reselect the tool and return its setup to move.

NOTE

● If you have changed its T number, you cannot change its setup from move to add or exchange with the MOVE > ADD button.   If you have added or exchange the tool with the MOVE > ADD button, you cannot change its T number.

SETUP COMPLETE

Registers the results of setup for tool layout.

NOTE

● Be sure to press the SETUP COMPLETE button.   If the button is not pressed, the tool information will be incorrect.

BACK

Returns to the SETUP MAIN display.

TOOL INSTALLED SCREEN display

T No.	Rar	Shape		X	Y	R	Angle	Tooling manager	Shape sub code	Air blow	Press M-code	Slitting name	
201	E	▭	Rectangle	12.00	2.00	0.00	0.00		Normal	Not regis	0		
102	A	▢	Square	5.00	5.00	0.00	0.00			Not regis	0		
203	A	⬭	Obround	3.00	2.00	0.00	0.00		Normal	Not regis	0		
304	A	▭	Rectangle	5.00	2.00	0.00	0.00		Normal	Not regis	0		
105	B	◯	Corner R	10.00	4.00	1.00	0.00			Not regis	0		
306	B	⬜	R Rectangle	5.00	3.00	1.00	90.00		Normal	Not regis	0		
107	A	◯	Round	5.00	5.00	0.00	0.00		Normal	Not regis	0		
208	A	◯	Round	4.00	4.00	0.00	0.00		Normal	Not regis	0		
309	A	Ⓐ	Marking	0.00	Up	0.00	90.00		No key	Not regis	0		

TOOL EXCHANGE

TOOL EXCHANGE
Refer to "TOOL USED SCREEN display".

BACK
Returns to the SETUP MAIN display.

LAYOUT SCREEN display

TOOL EXCHANGE
Refer to "TOOL USED SCREEN display".

ALL
Shows the entire turret diagram.

TOP ZOOM-IN
Shows the upper part of the turret diagram enlarged.

BOTTOM ZOOM-IN

Shows the lower part of the turret diagram enlarged.

TURRET ROTATION

Rotates the turret diagram clockwise.

MOVE > ADD

Refer to "TOOL USED SCREEN display".

TOOLSET COMPLETE

Select the station you want to set up, and press this button.   The setup of the selected station is registered.   The data of the setup tools are registered in the installed tool list, and the display is changed.

User/Difference/All selection

Used to change items of tool information on the display.

• User: User-set items of tool information are displayed by default.

• Difference: Places a mark after an item of tool information to indicate that the tool installed is different from the setup tool. Marked items of tool information are displayed. (T numbers and ranges are unconditionally displayed.)

• All: All items of tool information, including non-user-set items of tool information, are displayed.

BACK

Returns to the SETUP MAIN display.

MATERIAL/CLAMP SETUP display

Press the MATERIAL/CLAMP SETUP button on the SETUP MAIN display to open the MATERIAL/CLAMP SETUP display.   Make material and clamp setup calculations according to the setup instructions.

SETUP COMPLETE

After completing the setup calculations, press this button.

NOTE

● Be sure to press the SETUP COMPLETE button.   If the button is not pressed, the tool information will be incorrect.

BACK

Returns to the SETUP MAIN display.

NOTE

● If the application setting tool setup box or material/clamp setup check box is checked, pressing the SIM button causes the setup calculations to be made. If the check box is not checked, pressing the setup button does not cause the setup calculations to be made.   For further information on the setup conditions, see "Application setting setup".

TRANS JOB button

Effective only when the automatic operating mode is PROGRAM.

Press the button to select the program to be transferred from the PRE-EDIT display to the PROGRAM display.

SWITCH button

Changes from one command button menu to the other.
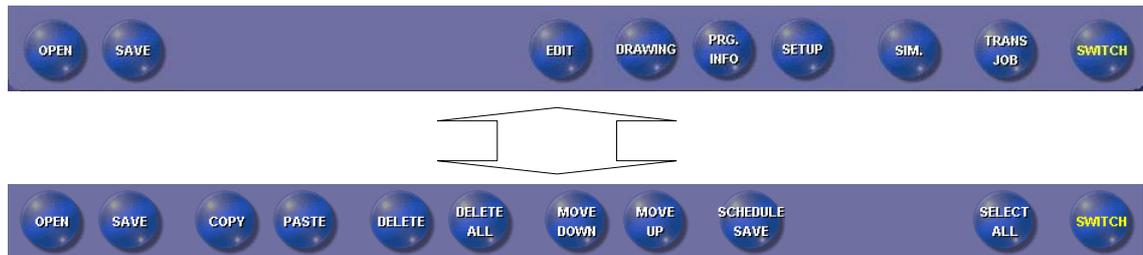
COPY button

Copies the program or programs called to the data edit area.

Select the program or programs to copy, and press the button.

PASTE button

Pastes the copied program or programs in the data edit area.

Select the line of the list to which to paste the program or programs, and press the button.

DELETE button

Deletes the program or programs called to the data edit area.

Select the program or programs to delete, and press the button.

DELETE ALL button

Deletes all of the programs called to the data edit area.

MOVE UP button

Moves up the selected program or programs in the data edit area.

Select the program or programs to move up, and press the button.

MOVE DOWN button

Moves down the selected program or programs in the data edit area.

Select the program or programs to move down, and press the button.

SCHEDULE SAVE button

Enabled only on the PRE-EDIT display or SCHEDULE display.   Saves the selected job list with a schedule name.

SELECT ALL button

Select all programs or schedules shown on the display.

PRE-EDIT display
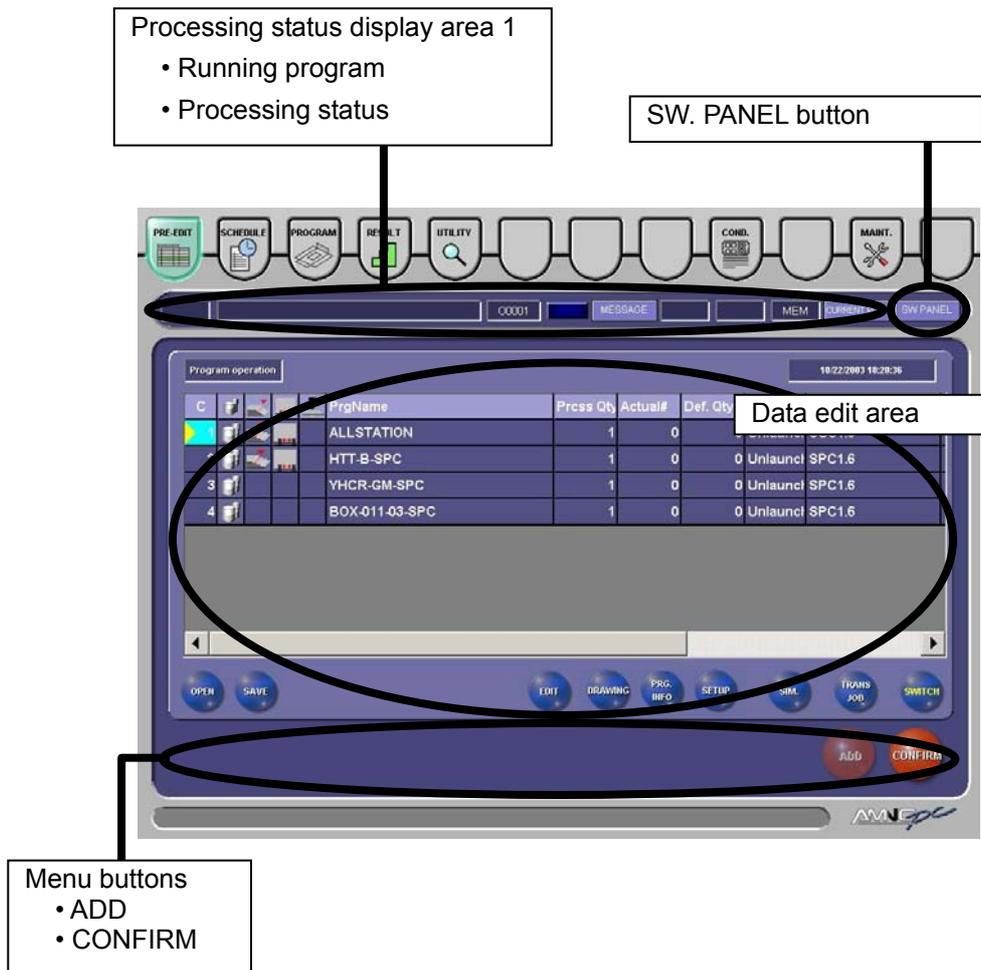
Processing status display area 1
  • Running program
  • Processing status

SW. PANEL button

Data edit area

Menu buttons
  • ADD
  • CONFIRM

PROCESSING STATUS DISPLAY AREA 1

Refer to "Processing status display area 1" described in "DESCRIPTION OF DISPLAYS".

SW. PANEL BUTTON

Refer to "SW. PANEL button" described in "DESCRIPTION OF DISPLAYS".

DATA EDIT AREA

Refer to "Data edit area" described in "DESCRIPTION OF DISPLAYS".

MENU BUTTON AREA

ADD

Adds to the SCHEDULE display the program selected in the program list created on the PRE-EDIT display.

NOTE

● The ADD button cannot be used when the automatic operating mode is PROGRAM.

CONFIRM

Registers to the SCHEDULE or PROGRAM display the program selected in the program list created on the PRE-EDIT display.

NOTE

● The selected program is registered to the PROGRAM display when the automatic operating mode is PROGRAM and to the SCHEDULE display when the automatic operating mode is SCHEDULE.

SCHEDULE display

Processing status display area 1
- Name of running program
- Processing status

SW. PANEL button

| PRE-EDIT | SCHEDULE | PROGRAM | RESULT | UTILITY | | | | COND. | | MAINT. |

| AMNCF-03-SPC | O0001 | | MESSAGE | | | MEM | CURRENT | SW PANEL |

| SCHEDULE | PROGRAM | CNC | | | 10/22/2003 13:42:12 |

Data edit area

C					PrgName		Prcss Qty	Actual#	Def. Qty		
1					TEST-1-1-SPC		2	0	0		
2					BASEPLATE-001-A		5	0	0	Unlaunch	
3					HKM713-P306C		1	0	0	Unlaunch	
4					BOX-011-03-SPC		1	0	0	Unlaunch	
5					HTT-B-SPC		3	0	0	Unlaunch	
6					YHCR-GM-SPC		1	0	0	Unlaunch	

ABSOLUTE				Cycle Time		0:00:00		
X:	2500.00	T:	201	A:	0.00	JOB end time	:		JOB in operation	0
Y:	1270.00	C:	0.00			All process end time	:		

| OPEN | SAVE | | | | EDIT | DRAWING | PRG. INFO | SETUP | SIM | START JOB | SWITCH |

AMNCpc

Operating mode change buttons
- SCHEDULE
- PROGRAM
- CNC

Processing status display area 2
- Machine coordinates
- Processing time

PROCESSING STATUS DISPLAY AREA 1

Refer to "Processing status display area 1" described in "DESCRIPTION OF DISPLAYS".

PROCESSING STATUS DISPLAY AREA 2

Refer to "Processing status display area 2" described in "DESCRIPTION OF DISPLAYS".

SW. PANEL BUTTON

Refer to "SW. PANEL button" described in "DESCRIPTION OF DISPLAYS".

DATA EDIT AREA

Refer to "Data edit area" described in "DESCRIPTION OF DISPLAYS".

START JOB

Sets the start job.

Select the program to set in the start job, and press START JOB.

OPERATING MODE CHANGE BUTTONS

Change the automatic operating mode of the machine.

SCHEDULE: Pressed to perform the schedule operation of the machine.

PROGRAM: Pressed to perform the single-program operation of the machine.

CNC: Pressed to perform the CNC operation of the machine.　Press and illuminate the REMOTE button on the panel B to perform the DNC operation.

NOTE

- The automatic operating mode of the machine cannot be changed while it is operating.
- The CNC operation is the method whereby the machine is operated according to the programs that are managed by their O numbers in the CNC unit.
- The DNC operation refers to the operation of the machine according to the data being sent from an external personal computer with a terminal function to the NC unit.
- To perform the DNC operation of the machine, illuminate the REMOTE button on the. PANEL B.
- Change the automatic operating mode on the SCHEDULE or PROGRAM display.　It may not have changed on the PRE-EDIT display.

PROGRAM display
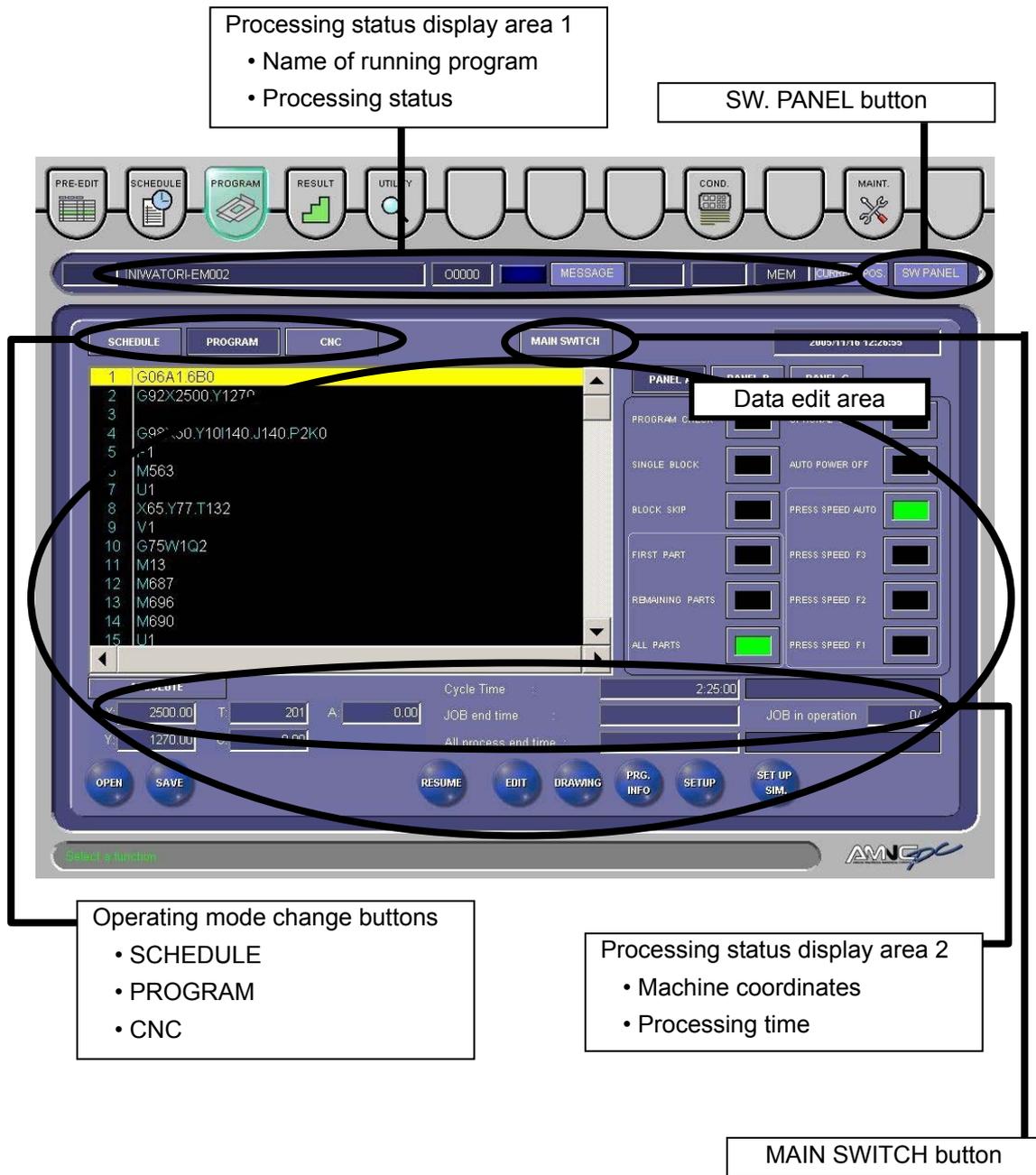
Processing status display area 1
• Name of running program
• Processing status

SW. PANEL button

Data edit area

Operating mode change buttons
• SCHEDULE
• PROGRAM
• CNC

Processing status display area 2
• Machine coordinates
• Processing time

MAIN SWITCH button

PROCESSING STATUS DISPLAY AREA 1

Refer to "Processing status display area 1" described in "DESCRIPTION OF DISPLAYS".

PROCESSING STATUS DISPLAY AREA 2

Refer to "Processing status display area 2" described in "DESCRIPTION OF DISPLAYS"..

SW. PANEL BUTTON

Refer to "SW. PANEL button" described in "DESCRIPTION OF DISPLAYS".

DATA EDIT AREA

Refer to "Data edit area" described in "DESCRIPTION OF DISPLAYS".

OPERATING MODE CHANGE BUTTONS

Change the automatic operating mode of the machine.

SCHEDULE: Pressed to perform the schedule operation of the machine.

PROGRAM: Pressed to perform the single-program operation of the machine.

CNC: Pressed to perform the CNC operation of the machine. Press and illuminate the REMOTE button on the panel B to perform the DNC operation.

NOTE

● The automatic operating mode of the machine cannot be changed while it is operating.
● The CNC operation is the method whereby the machine is operated according to the programs that are managed by their O numbers in the CNC unit.
● Change the automatic operating mode on the SCHEDULE or PROGRAM display. It may not have changed on the PRE-EDIT display.

MAIN SWITCH BUTTON

Switches between displaying the contents of the program alone and on-line drawing.

On-line drawing refers to the method of drawing a part sequentially according to the blocks of the program to be executed.
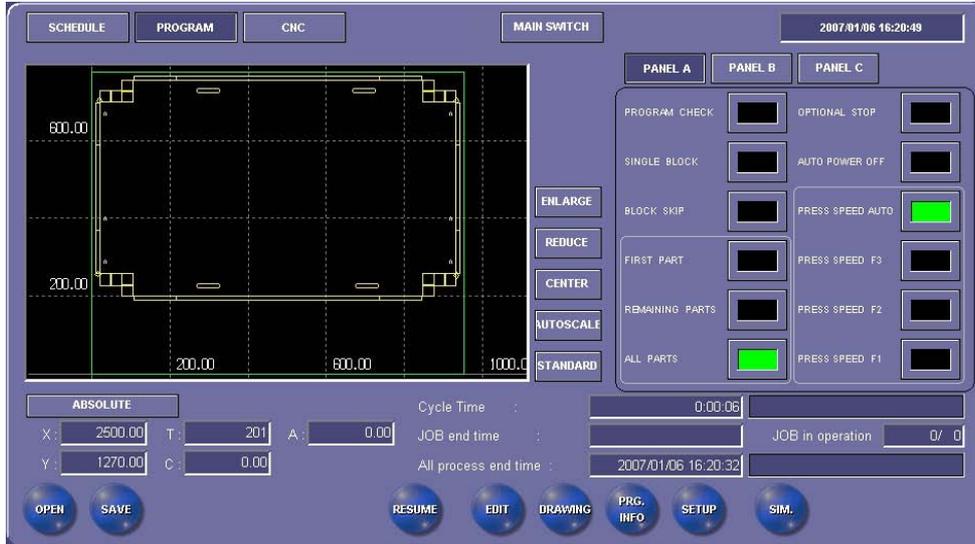
ENLARGE

Enlarges the selected portion of the figure drawn in the draw area.

Press the button, and select the portion of the drawn figure to expand.

REDUCE

Reduces the selected portion of the figure drawn in the draw area.

The reduction is referenced to the center of the draw area.

CENTER

Press the button, and select the portion of the figure to place the selected portion at the center of the draw area.

AUTOSCALE

Draws a figure on an automatic scale.

STANDARD

Draws a figure in the reference position.

RESUME BUTTON

Pressed to open the Resume display and enable the resume function.

When the machine is stopped for some cause, the resume function allows the machine to resume its processing operation from the interrupted position after the cause of the stop is removed.
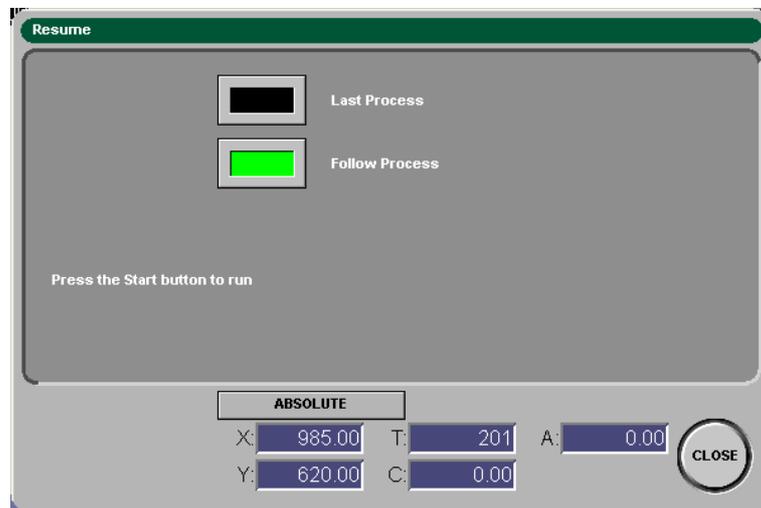
Last Process button

Resumes the processing operation from the interrupted block of the interrupted program.

Follow Process button

Resumes the processing operation from the next block of the interrupted block of the interrupted program.

CLOSE button

Closes the Resume display.

NOTE

● The Resume display cannot be opened while the machine is operating.

● The machine displays a message as shown on the next page and cannot resume the processing operation when:

  • The workclamps are opened after repositioning (G25 or G27).

  • The workclamps are opened after the dead zone avoid command (G05 --- K1 (or K2);) of the clamp positioner.

  • The resumed program involves no processing (or press operation).

  • The PRESS SELECT keyswitch is set to a position other than CYCLE or is turned to another position during the interruption of the processing operation.

  • Another multiple-part punching setup button is pressed.

  • The block skip function is reset.

  • The single block operation is enabled.

  • The program check function is enabled.

  • The automatic operating mode is not PROGRAM (or is DNC, SCHEDULE or CNC).

Operating procedure

1   Check that the NC mode is MEMORY.

2   Select the process to resume with the Last Process and Follow Process buttons.

3   Press the START button to scroll the program to the interrupted block.

4   The Resume display closes, the MACHINE STOP light illuminates, and the following message appears.

5   Press the START button to resume the operation of the machine from the specified process.

RESULT display

Statistical information area
- Total processing time
- Average processing time
- Total number of parts produced

Result display area

The RESULT display shows the actual processing results of the machine.

The buttons on the RESULT display are as follows:

NOTE

● The actual processing results cannot be registered unless the Schedule results item "Regist" is selected on the OPERATION SETTINGS display. The OPERATION SETTINGS display appears when the MAINT button and USER SETTINGS button are pressed.

Program Unit button

Lists the actual processing results on a program (or job) basis.

One Unit button

Lists the actual processing results on a total number of pats produced basis.

SEARCH

Pressed to open the Search (Process History) display.

Set the search conditions, and press OK.
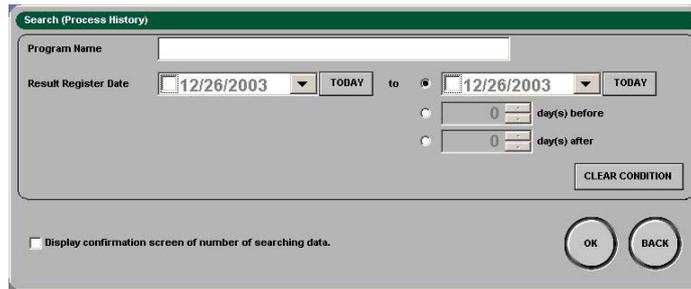
Program Name: Enter the program name to search for.

Result Register Date: Select the date or period to search for.

TODAY'S DATE: Sets the current date as the date to search for.

CLEAR CONDITION: Clears the search conditions.

OK: Searches the results according to the search condition.
BACK: Returns to the previous display.

NOTE

● Check the "Display confirmation screen of number of searching data" box to
  show the search result confirmation display.

FILE OUTPUT

Pressed to open the File Output (Process History) display.

Input the output folder name and file name, and press the OK button.
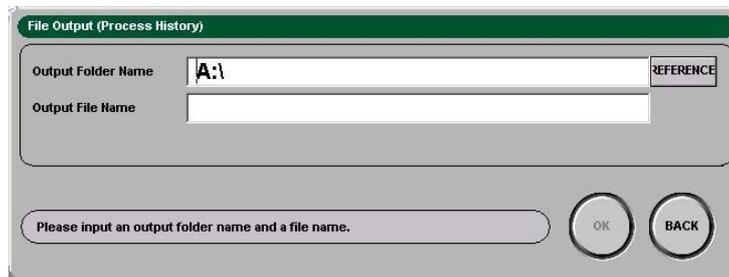
NOTE

● It is possible to select the file output folder in the window shown below if the
  REFERENCE button is pressed on the File Output (Process History) display.
● The file storage format is CSV.
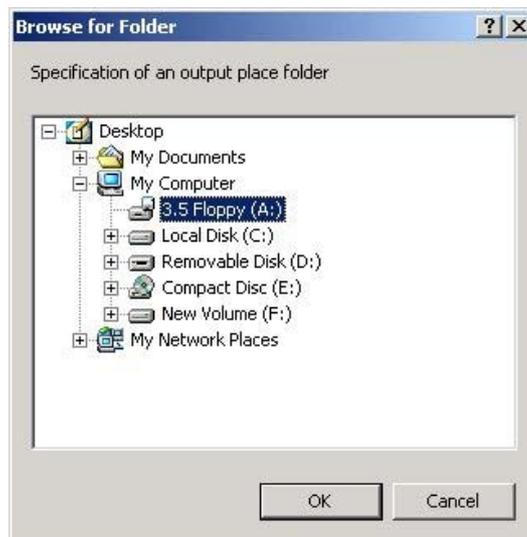
DELETE

Pressed to delete individual items of the actual result data.

Select the data to delete, and press DELETE.

DELETE ALL

Pressed to delete all of the actual result data.

UPDATE

Pressed to update the actual result data.

> NOTE
>
> ● If the worksheet is processed with the RESULT display shown on the screen, the actual results cannot be accurately stored in the memory of the NC unit. In this case, press UPDATE to change to the latest actual result data.

UTILITY display

NOTE

● Operation may only be executed in the MEMORY mode.
The following message appears if the operator attempts to open a display in any other NC mode (RETRACT, MANUAL, MDI, EDIT mode).
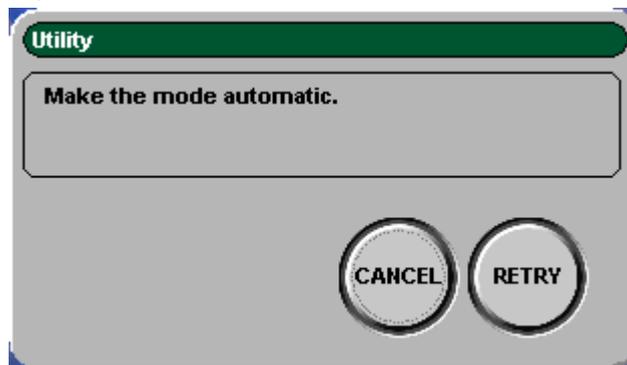
Select the MEMORY mode and press the RETRY button, or press the CANCEL button to cancel the operation.   The message window closes.

UTILITY1

G50

Pressed to open the G50 (zero-return) display.
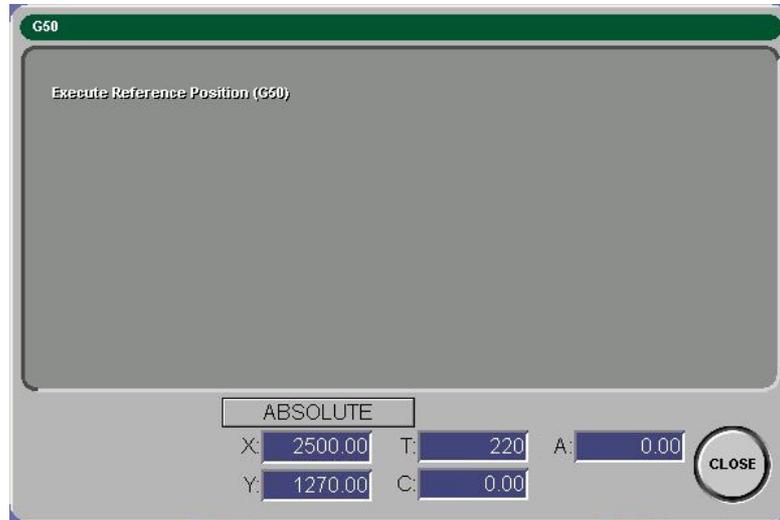
Buttons on the G50 display

Coordinate display changeover button

Used to change the absolute coordinate or mechanical coordinate.

CLOSE

Closes the G50 display.

Operation procedures

1   Make sure that the MEMORY mode is selected.

2   Press the G50 button to open the G50 display.

3   Press the START button.   Each axis returns to the origin.   The display closes after completion of the return to origin.

NOTE

● Before performing the G50 operation, press and illuminate the MEMORY button on the main control panel.

Return to 2nd Machine Position

Pressed to open the Return to the 2nd Machine Position display.
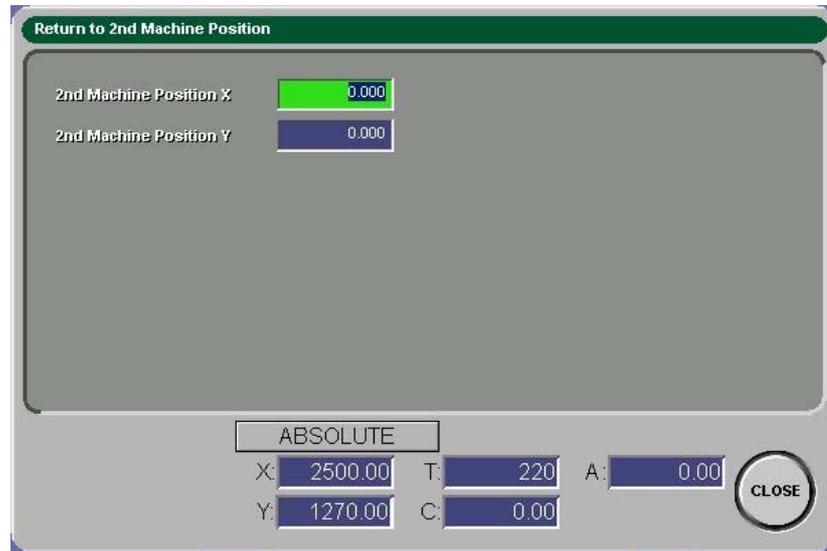
2nd Machine Position X:

Set the 2nd machine position X.

2nd Machine Position Y:

Set the 2nd machine position Y.

Buttons on the 2nd Machine Position display

Coordinate display changeover button

Used to change the absolute coordinate or mechanical coordinate.

CLOSE

Closes the Return to the 2nd Machine Position display.

Operation procedures

1   Make sure that the MEMORY mode is selected.

2   Press the Return to 2nd Machine Position button to open the Return to 2nd Machine Position display.

3   Press the START button.　Each axis moves quickly to the position set in [2nd Machine Position X] and [2nd Machine Position Y]. The display closes after completion of the moving to machine position.

―――――― NOTE ――――――

● Before performing the Return to 2nd Machine Position operation, press and illuminate the MEMORY button on the main control panel.

G00

Pressed to open the G00 (Positioning) display.

G00
Absolute Position X [0.000]
Absolute Position Y [0.000]
ABSOLUTE
X: 2500.00 T: 220 A: 0.00
Y: 1270.00 C: 0.00 CLOSE
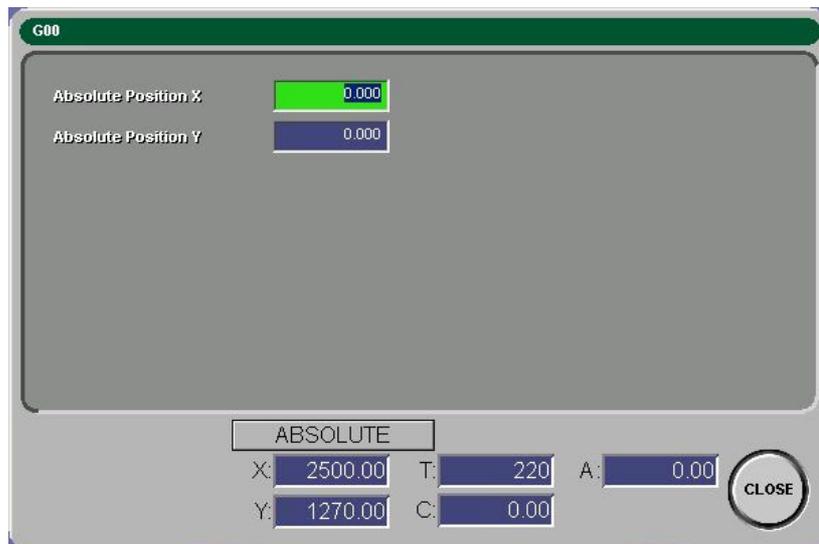
Absolute Position X:

Set the change position X.

Absolute Position Y:

Set the change position Y.

Buttons on the G00 display

Coordinate display changeover button

Used to change the absolute coordinate and mechanical coordinate.

CLOSE

Closes the G00 display.

Operation procedures

1   Make sure that the MEMORY mode is selected.

2   Press the G00 button to open the G00 display.

3   Press the START button.   Each axis moves quickly to the position set in [Absolute Position X] and [Absolute Position Y].   The display closes automatically after completion of the moving to machine position.

NOTE

● Before performing the G00 operation, press and illuminate the MEMORY button on the main control panel.

Unloading (Option)

Pressed to open the Unloading display to automatically unload the worksheet when its processing is interrupted during line operation.
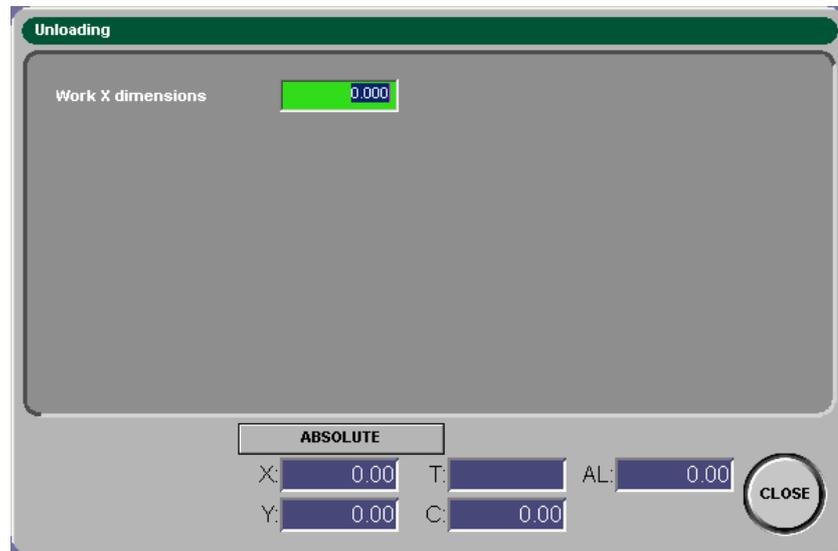
Work X dimensions:

Set the X dimension of the worksheet.

Buttons on the Unloading display

Coordinate display changeover button

Used to change the absolute coordinate and mechanical coordinate.

CLOSE

Closes the Unloading display.

Operating procedures

1 Make sure that the MEMORY mode is selected.

2 Press the Unloading button to open the Unloading display.

3 Press the START button. The unloading unit unloads the worksheet. The display closes automatically after completion of the unloading operation.

NOTE

● This function applies to the unloading units that can unload worksheets at the G10 command.

● Turn the LINE ON/OFF keyswitch to ON to enable this function. The worksheet can be unloaded only onto the pallet in the unloading position.

Clamp Positioning (Option)

Pressed to open the Clamp Positioning display.

Instruction Pos.:

Set the command position of workclamp 1 and workclamp 2.   The command position must fall within the settable range.   For details, refer to "Clamp Positioner" in the Accessory manual.   The distance between workclamp 1 and workclamp 2 must be at or greater than the minimum workclamp distance.   For details, refer to "Clamp Positioner" in the Accessory manual.

Present Pos.:

Displays the current position of workclamp 1 and workclamp 2.   These fields appear blank until the workclamp positioning command is executed immediately after the machine is turned on, after the workclamps are opened, after the machine is stopped in an emergency, or immediately after the workclamps are positioned for the 50th time.

Buttons on the Clamp Positioning display

Coordinate display changeover button

Used to change the absolute coordinate and mechanical coordinate.

CLOSE

Closes the Clamp Positioning display.

Operation procedures

1 Make sure that the MEMORY mode is selected.

2 Press the clamp positioning button to open the Clamp Positioning display.

3 When the START button is pressed, workclamp 1 and workclamp 2 position themselves at the positions set in the Instruction Pos. fields.   When the workclamp positioning operation is completed, the Clamp Positioning display automatically closes.

NOTICE

● Immediately after the machine is turned on, after the workclamps are opened, after the machine is stopped in an emergency, or immediately after the workclamps are positioned for the 50th time, the workclamp position read operation is performed to read the workclamp positions into the NC unit, and the workclamps are then positioned.

● After the workclamps position themselves immediately after the workclamp position read operation, the machine checks the workclamps to see if they are positioned at the position where they were positioned by the clamp positioner.

● Do not perform this function with the worksheet set on the machine.

NOTE

● The Clamp Positioning display does not open when the AUTO ON/OFF keyswitch is set at OFF or the LINE ON/OFF keyswitch is set at ON.

● If the AUTO ON/OFF keyswitch is turned to OFF or the LINE ON/OFF keyswitch is turned to ON when the Clamp Positioning display is opened, the alarm "2307 LINE SW ON OR AUTO SW OFF" appears.   The machine cannot be started in this condition.   When the AUTO ON/OFF keyswitch is turned back to ON or the LINE ON/OFF keyswitch is turned back to OFF, the alarm disappears, and the machine can be started.

● This function does not execute the pause command to set the worksheet and disables the pause judgment function.

Adjust Tap button (optional)

Pressed to open the Adjust Tap display.
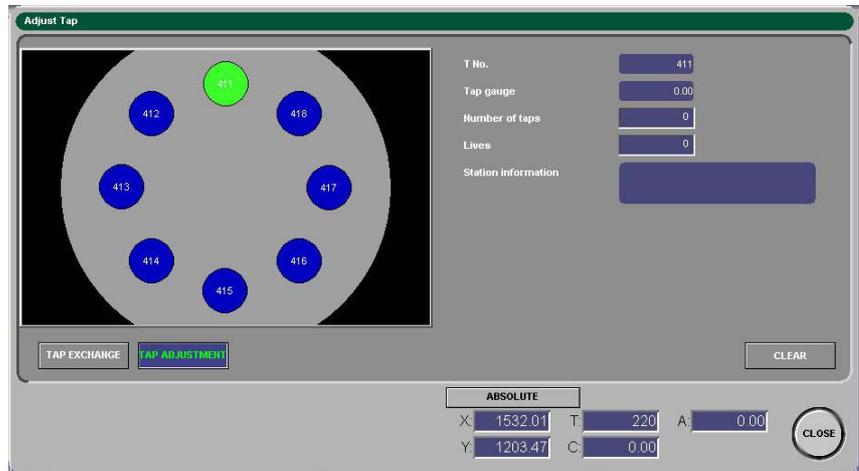
T No.:

Shows the T number of the selected tap.

Tap gauge:

Shows the diameter of the selected tap.

Number of taps:

Shows the current hit count of the selected tap.

To change the value of this field, enter a new value, and press the Enter key on the keyboard to make the change.

Lives:

Shows the lifetime hit count of the selected tap.

To change this field, enter a new hit count, and press the Enter key on the keyboard to make the change.

Station information:

Shows the station information of the selected tap.

Buttons on Adjust Tap display

TAP EXCHANGE button

Pressed to change to the tap changing function.

TAP ADJUSTMENT button

Pressed to change to the tap adjusting function.

Coordinate display changeover button

Pressed to change between the absolute coordinate and machine coordinate.

CLEAR button

Pressed to clear the tap breakage information when the tap is broken.

The station where the tap is broken is shown red.

CLOSE button

Pressed to close the Adjust Tap display and returns to the UTILITY display.

Tap changing function

Operating procedure

1   Turn the SAFETY DEVICE keyswitch to SETTING.

2   Press the MEMORY button.

3   Turn the TOOL CHANGE keyswitch on the subcontrol panel B to ON.

4   Press the UTILITY button on the touch panel of the NC control panel to open the UTILITY display.

5   Press the Adjust Tap button on the UTILITY display to open the Adjust Tap display.

6   Press the TAP EXCHANGE button on the Adjust Tap display to switch to the tap changing function.

7   On the tap turret diagram of the Adjust Tap display, press and select the station whose tap you want to change.   The selected station appears green.

8   Press the START button.   The tap turret rotates to move the selected tap station to the tap changing position.

Tap adjusting function

Operating procedure

1   Turn the SAFETY DEVICE keyswitch to SETTING.

2   Press the MEMORY button.

3   Turn the TOOL CHANGE keyswitch on the subcontrol panel B to ON.

4   Press the UTILITY button on the touch panel of the NC control panel to open the UTILITY display.

5   Press the Adjust Tap button on the UTILITY display to open the Adjust Tap display.

6   Press the TAP ADJUSTMENT button on the Adjust Tap display to switch to the tap adjusting function.

7   On the tap turret diagram of the Adjust Tap display, press and select the station whose quick approach position tap you want to check.   The selected station appears green.

8   Press the START button.   The tap turret rotates to position the selected station at the tap center.

9   Press the MANUAL button.

10   Press and hold the TURRET JOG ON button to cause the tap to quickly approach.   At this time, do not close the Adjust Tap display.   The tap can quickly approach only when the Adjust Tap display is open.

NOTE

● For the tap changing procedure, refer to the accessory manual.

UTILITY2

Settings

Opens the UTILITY SETTINGS display to arrange the sequence of buttons on the UTILITY display.
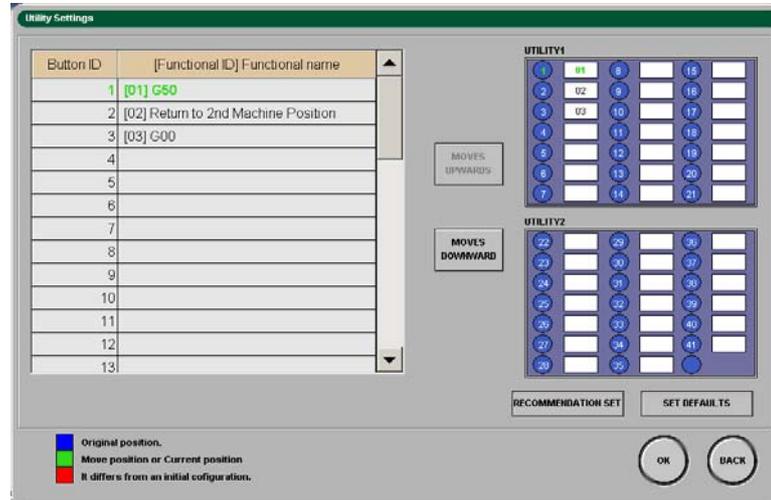
Buttons on the UTILITY SETTINGS display

MOVES UPWARDS

Moves up the currently selected function (illuminated green).

MOVES DOWNWARDS

Moves down the currently selected function (illuminated green).

RECOMMENDATION SET

Rearranges the buttons in the Amada-recommended sequence and closes the display.

SET DEFAULTS

Returns the buttons to the sequence set at the time of factory shipment and closes the display.

OK

Updates to the new contents and closes the display.

BACK

Closes the display and returns to the UTILITY display.

MESSAGE display

RAISE ALARM

Shows the current alarms.

HISTORY

Shows the alarm history.

DELETE

Deletes an alarm history.

Select the alarm history to delete, and press DELETE.

DELETE ALL

Deletes all alarm histories.

Processing condition displays

Press the COND. button to open one of the processing condition displays.

There are four processing condition displays: STD INPUT, GUIDE INPUT, TOOLING DATA, and AUTO TIMER displays.

STD INPUT (M-CODE LIST) DISPLAY

Press the STD INPUT button to open the STD INPUT display.

On the STD INPUT display, set the parameters of the press pattern (press mode) M-codes required for the automatic operation of the machine. For the details of the press patterns, refer to Part V, Press axis control parameters.

NIBBLING

Displays a nibbling pattern M-code (M12) and its parameters.

PUNCHING

Displays punching pattern M-codes (M500, M501 and M696), and their parameters.

KNOCKOUT

Displays knockout pattern M-code (M502 to M505 and M570 to M575), and their parameters.

MARKING

Displays marking pattern M-code (M560 to M569), and their parameters.

SLITTING

Displays slitting pattern M-codes (M506 to M509), and their parameters.

FORMING

Displays forming pattern M-codes (M510 to M559 and M800 to M999), and their parameters.

DEFAULT

Returns the parameter values of the selected M-code to the default values.

CALCULATE DIE HEIGHT

Automatically calculates the die height parameter value when the punch length parameter value and die length parameter value are entered.

TRIAL PUNCH

Changes to the Trial Punch display.

STD INPUT

Changes to the STD INPUT display.

GUIDE INPUT

Changes to the GUIDE INPUT display.

TOOLING DATA

Changes to the TOOLING DATA display.

AUTO TIMER

Changes to the AUTO TIMER display.

REGISTER

Registers the newly set parameters in the memory of the NC unit.

NOTE

● When the parameter value or values are changed, the change is not stored in the memory of the NC unit unless the REGISTER button is pressed.
● The punch length parameter value and die length parameter value are entered only to calculate the die height parameter value and are not stored in the memory of the NC unit.

RESTORE

Used by AMADA for maintenance purposes.

GUIDE INPUT DISPLAY

Sets the press pattern parameters required for the automatic operation of the machine.   For detailed information on the press patterns, refer to Part V, Press axis control parameters.

Press the GUIDE INPUT button to open the GUIDE INPUT display.

For information about the buttons on the display, refer to "STD INPUT (M-code list)".

TOOLING DATA DISPLAY

If the tooling parameters Punch Length, Assy Length, Cut Line, and Shear are set for each turret station, the worksheet can be punched at a speed that suits the set punch size, or some of the press pattern (press mode) commands can be omitted in the program.   The press position can also be compensated for reground punches.   For the details of the tooling parameters, refer to Part V, Press axis control parameters.

Press the TOOLING DATA button to open the TOOLING DATA display.
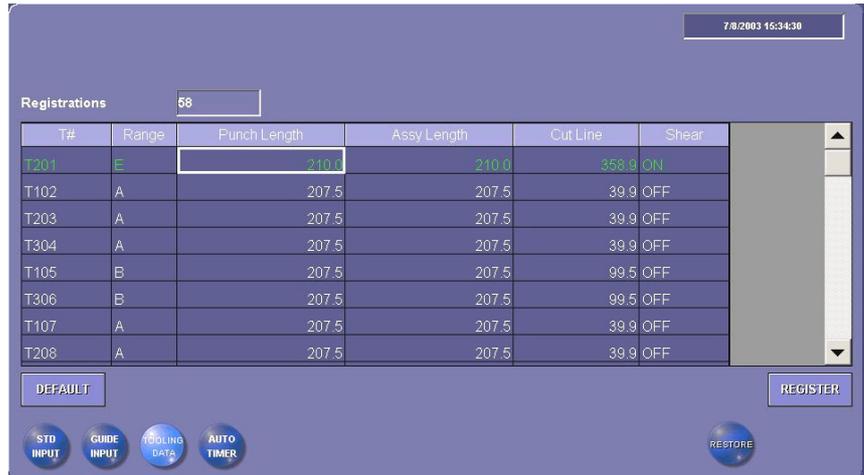
						7/8/2003 15:34:30

Registrations   58

T#	Range	Punch Length	Assy Length	Cut Line	Shear
T201	E	210.0	210.0	358.9	ON
T102	A	207.5	207.5	39.9	OFF
T203	A	207.5	207.5	39.9	OFF
T304	A	207.5	207.5	39.9	OFF
T105	B	207.5	207.5	99.5	OFF
T306	B	207.5	207.5	99.5	OFF
T107	A	207.5	207.5	39.9	OFF
T208	A	207.5	207.5	39.9	OFF

DEFAULT   REGISTER

STD INPUT   GUIDE INPUT   TOOLING DATA   AUTO TIMER   RESTORE

DEFAULT: Returns the parameter values of the selected T-number to the default values.

NOTE

● When the parameter value or values are changed, the change is not stored in the memory of the NC unit unless the REGISTER button is pressed.

AUTO TIMER DISPLAY

Press the AUTO TIMER button to open the AUTO TIMER display.

When the PRESS SPEED AUTO button on PANEL A is pressed and illuminated and the Auto Timer switch on the AUTO TIMER display is set to ON, the press speed can be automatically reduced to alleviate punching noise in the preset night and midnight time zones.   When you want to have the press speed automatically reduced to prevent night punching noise, set the night and midnight time zones to suit your situation.   For the details of time zone settings, refer to Part V, Press axis control parameters.
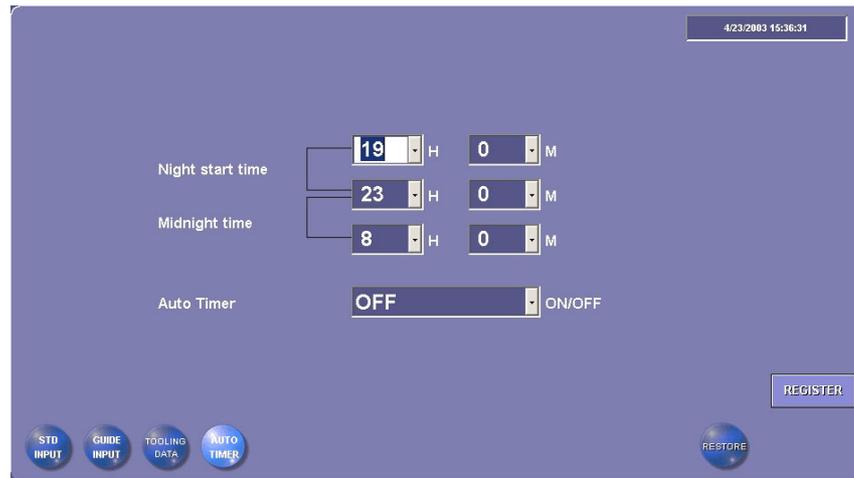
NOTE

● When the time zone settings are changed, the change is not stored in the memory of the NC unit unless the REGISTER button is pressed.

Maintenance display

Press the MAINT. button to open one of the maintenance displays to set the display conditions.

The display has twelve buttons: USER SETTINGS, APPLICATION SETTINGS, DATA INPUT AND OUTPUT, HIT COUNT MANAGEMENT, CNC MAINTENANCE, VERSION INFORMATION, EXTERNAL IO SETUP, E-MAIL NOTICE FUNCTION, BACKUP SCHEDULER, INSPECTION and two blanks.

MAINTENANCE 1 button

Pressed to open the MAINTENANCE 1 display.

MAINTENANCE 2 button

Pressed to open the MAINTENANCE 2 display.

USER SETTINGS BUTTON

Pressed to open the User settings display.

The User settings display consists of OPERATION SET, SELECT VIEW, SPECIFY DRIVE, AUTO TIMER, SYSTEM MANAGER, and SAVING CONDITION.

OPERATION SET display

Schedule completion value

Sets whether or not to clear the actual results before reading a schedule file.

Schedule results

Sets whether or not to register the actual schedule results.

Completion register method

Sets whether to register the actual processing results at the end of each worksheet or operation.

Actual process time

When you want to specify the timing of calculating the actual processing time, check the Actual result working time check box, and enter the number of worksheets at which to calculate the actual processing time.

NOTE

● This timing can be set only when you have selected the method of registering the actual processing results at the end of each worksheet.

Registration

Sets whether or not to register the actual processing results.

Registration method

Sets whether to register the actual processing results at the end of each worksheet or operation.
Per process: Registers the actual processing results at the end of each worksheet.
Operation end time: Registers the actual processing results at the end of each operation.

Display Program name

Sets whether to display the names of all programs or programs that have not been normally completed.

All Process Qty

Sets whether to count accepted parts alone or both accepted and rejected parts.

⚠ CAUTION	● When you have changed a condition or conditions, turn off the power and then turn it back on.

SELECT VIEW display

Enter process qty screen

Selects whether or not to display the number of worksheets processed. If you select to display, select whether to display the number of worksheets processed for each selection or each time the Add or Select button is pressed.

OPEN button control

Check the Data list check box to show the program list when the OPEN button is pressed on the PRE-EDIT, SCHEDULE, or PROGRAM display. Usually have this check box checked.

Check the Search screen check box to open the display for searching for the program or programs when the OPEN button is pressed.

SDD format FD display

Selects a display format.

Differentiate FDD media

Selects whether to judge the FDD media automatically or manually.

Where to locate Pre-edit data

Determines the part of the SCHEDULE display to which to add the program name or names from the PRE-EDIT display.

Pre-edit/schedule

Changes the contents of the PRE-EDIT or SCHEDULE display.

Call screen

Changes the contents of the Call display.

Tooling list

Changes the contents of the Tool list display.

Result

Changes the contents displayed on the Result display.

⚠ CAUTION	● When you have changed a condition or conditions, turn off the power and then turn it back on.

SPECIFY DRIVE display
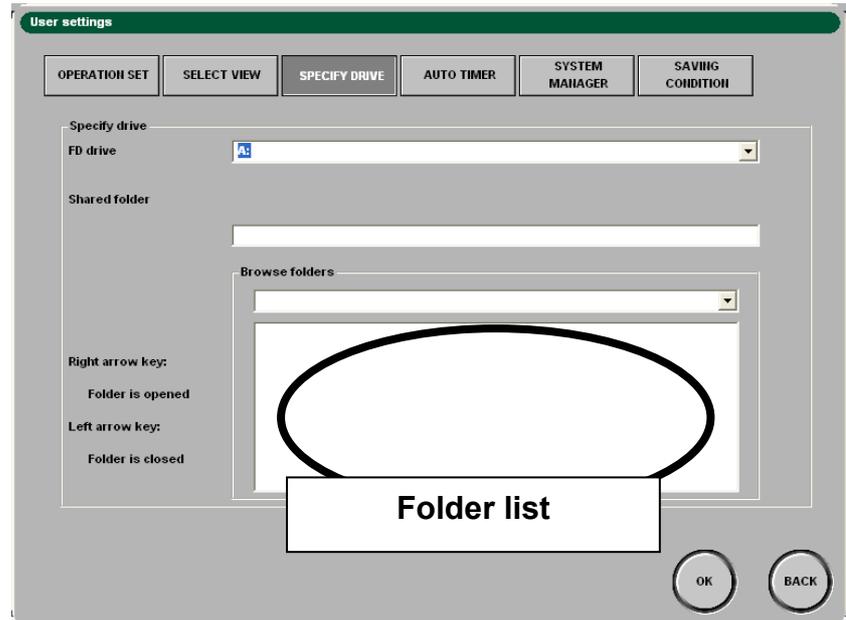
FD drive

Specifies the floppy disk drive.

Shared folder

Shows a share folder path.

To set a share folder, select the drive in the Browse folders field, and select the desired folder in the Folder list.

NOTE

● The share folder can be directly specified by a full path.

⚠ CAUTION	● When you have changed a condition or conditions, turn off the power and then turn it back on.

AUTO TIMER display

Material set

Sets the worksheet setting time to calculate the scheduled processing end time.

Average setup time

Sets the average setup time to calculate the scheduled processing end time.

Average process time

Sets the average operating time to calculate the scheduled processing end time.

⚠ CAUTION	● When you have changed a condition or conditions, turn off the power and then turn it back on.

SYSTEM MANAGER display

Backup scheduler

Sets whether or not to start the backup scheduler when the system is started.

For details, refer to the Backup Scheduler button.

Display results file item name

Sets whether or not to display the item names to the files to be output.

SAVING CONDITION display

Press the SAVING CONDITION button on the User settings display to show the items concerning the saving condition.

Output transfer ID

Sets the items of the transfer ID to output when saving the program data.

Output ER

Sets whether or not to insert ER (end of record (%)) at the beginning and/or the end of the program data.

NOTE

● Laser process condition and Cut condition are the invalid items for EM series.

APPLICATION SETTINGS BUTTON

Application settings display

Sets the conditions to perform setup simulation on the PRE-EDIT, SCHEDULE, and PROGRAM displays.

Tooling setup

Tool exchange setup:

The used tool information in the NC data and registered tool information are compared, and a tool instruction (exchange, move, rotate, etc.) is displayed on the tool setup display.   (The setup data are displayed on the setup display.)

T# automatic conversion:

The T number of the program is changed to the T number for the registered tool if there is a registered tool that has the same shape and dimensions as those of the tool used in the program.   (The judgment of the tool conditions differ with the items checked in the Application settings display.)
The T number not rewritten is enclosed in parentheses, ( ), and remains at the end of the line.
Rewriting applies to all effective jobs, if they are used for the schedule.

Tool arrangement

Check "Shape sub code", "Press M-code", and other items you want to display during setup simulation and tool setup.

T# automatic conversion Range C:

This is only effective for same range searches.

(G-to-A, A-to-G, A-to-L, or L-to-A conversion is not executed.)

T# automatic conversion Track C

Conversion into a different track is not executed if the track check function is active.

(T102-to-T203 conversion is not executed.)

Example of T# alignment conversion

Example 1: T# alignment - pattern 1

No	Program No.	Used tool
1	P001	T336 A Round 10
2	P002	
3	P003	T336 A Round 10
Installed tools (Registered tools)		
T336 A Empty		
T345 A Round 10		
Conversion result		
1	P001	T336-to-T345
2	P002	None
3	P003	T336-to-T345

Example 2: T# alignment - pattern 1

No	Program No.	Used tool
1	P001	T336 A Round 10
		T345 A Square 5 0°
2	P002	T336 A Square 5 0°
		T345 A Round 10
Installed tool (Registered tools)		
T336 A Square 5 0°		
T345 A Round 10		
Conversion result		
1	P001	T336-to-T345
		T345-to-T336
2	P002	None

Example 3: T# alignment - pattern 1

No	Program No.	Used tool
1	P001	T336 A Round 10
2	P002	T345 A Square 5 0°
3	P003	T336 A Round 10
Installed tool (Registered tools)		
T336 A Square 5 0°		
T345 A Round 10		
Conversion result		
1	P001	T336-to-T345
2	P002	T345-to-T336
3	P003	T336-to-T345

Work/Clamp arrangement

Check the item or items you want to display during setup simulation:

・Work

・Clamp (workclamp)

・Clearance (material)

NOTE

● The Clearance (work) item for the Material/Clamp arrangement cannot be set if Die clearance item for the Tool arrangement is checked.

⚠ CAUTION	● When you have changed a condition or conditions, turn off the power and then turn it back on.

DATA INPUT AND OUTPUT BUTTON

Pressed to copy and move a program or programs between media.

When the program or programs are copied or moved, they can also be renamed.
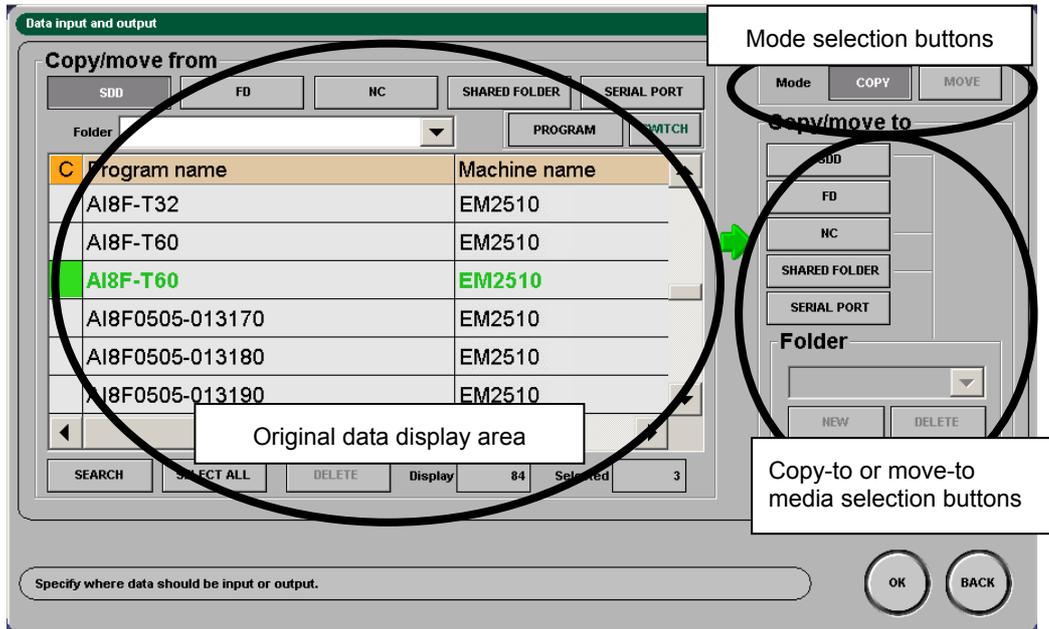
Mode selection buttons

COPY

Copy the program or programs between the media as described below.

1. In the original data display area, select the media where the program or programs to be copied are saved, and display a list of programs.

2. From the list displayed, select the program or programs to be copied.   (Multiple items can be selected.)

3. Press COPY.

4. Press one of the copy-to or move-to media selection buttons. With the SDD, NC and SHARED FOLDER buttons, you can select a folder.

5 Press OK to open the confirmation display.
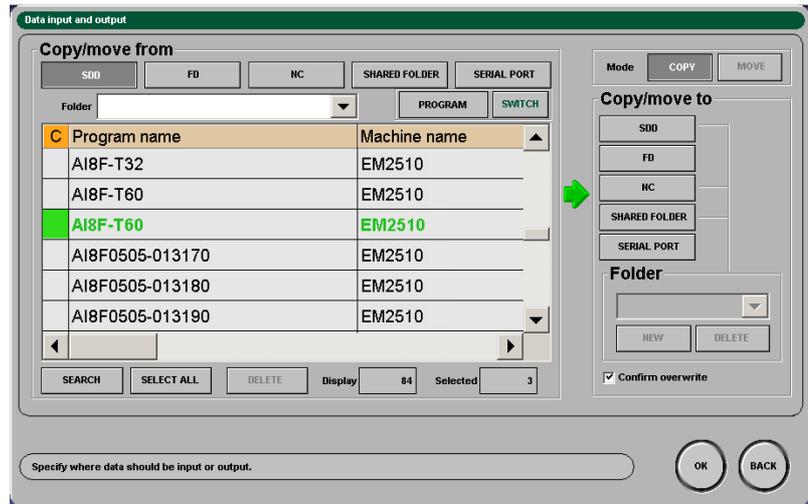
6 If the program or programs to be copied are OK, press COPY. To stop program copying, press ABORT.

NOTE

● To rename each program, select the program, and press RENAME. To return to the previous display, press BACK.

● The FD type field is displayed to allow the selection of the save-to location only when the FD button is pressed after the Differentiate FDD media field is set to Manual and the "Select media when selecting FD" check box is checked on the SELECT VIEW display, opened by clicking the SELECT VIEW tab, of the User settings display, a maintenance display.
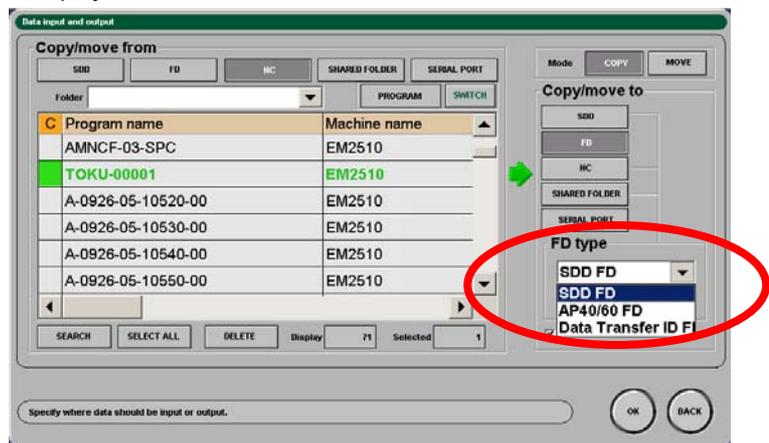
MOVE

When you move the program or programs between the media, press MOVE, and do as described in "COPY" above.

NOTE

● The program or programs cannot be moved when the copy-from or move-from media is SDD or SERIAL PORT.

Inputting and outputting programs with serial port

An external device can be connected to the serial port of the PANEL i at the lower rear of the main control box through the RS232C interface to input and output programs.

NOTE

● On the External IO Setup display, a maintenance display, complete the preparatory settings required to use the external device.   (Refer to page III-116.)

Input programs through the serial port into the NC unit as described below.

1   Open the Data input and output display, a maintenance display.

2   Select SERIAL PORT as copy-from or move-from media.

3   Select NC as copy-to or move-to media.

4   Press OK on the Data input and output display.
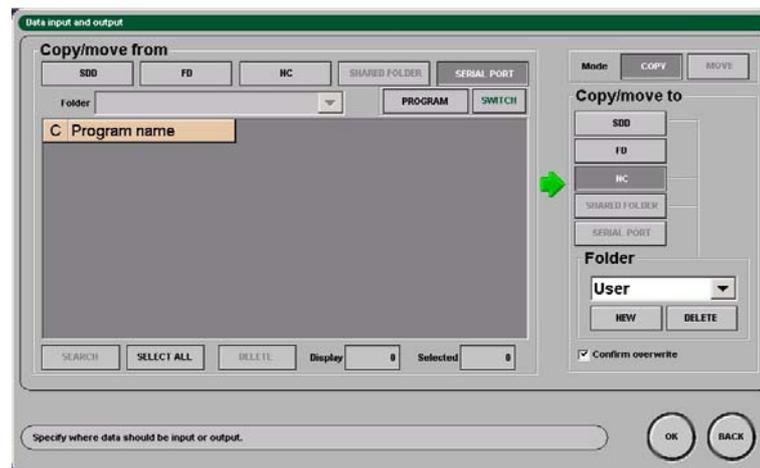
5   Make the external device ready for transmission.

Input Setting

Copying Source	Serial Port	Set	FANUC HANDY FILE
Copying Destination	NC	Folder	User

◉ Specify a name for each file. (Entry screen is shown.)

○ Create a name from a comment or O number.

○ Automatically create a name by adding serial number.

OK   **BACK**
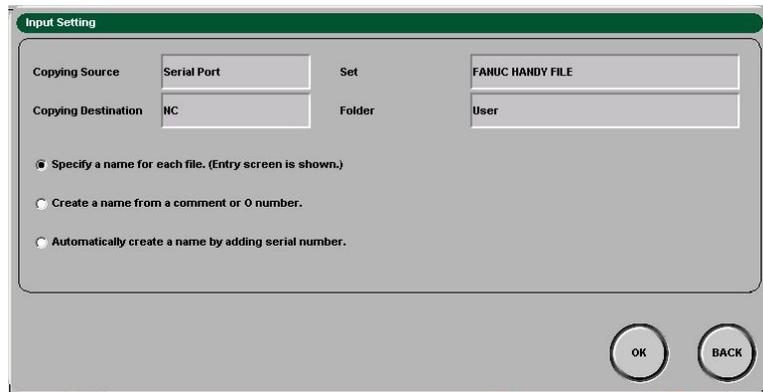
6   Press OK on the Input Setting display to start the input of the programs.

NOTE

● On the Input Setting display, select how to name the input programs.

Communication Status

Waiting for signal...

0 A byte has been received.

ABORT

HIT COUNT MANAGEMENT BUTTON

Pressed to open the Hit count management display.   Set the number of punches and tool life for each turret station on this display.
The number of punches and tool life of the taps may also be set if the optional multi-tap stations are available.

For PUNCH

Enter with the accessory keyboard the actual hit count and maximum hit count of a punch in the Number of punches and Lives fields, respectively, and press the ↵ key.

If you press BACK during the data entry, the new values are not stored in the memory of the NC unit.

NOTICE

● When the installed punches reach their maximum hit count, an alarm is not displayed.   Periodically check their hit count on this display.

NOTE

● The data in the Number of punches and Lives fields cannot be changed or set during automatic operation.   If you have changed the data in these fields by mistake during automatic operation, press the ESC key.

UPDATE

Updates the hit counts of the punches to the latest data.

PUNCH

Opens the hit count management display for the punches.

TAP (option)

Opens the hit count management display for the taps.

NOTE

● The display is not opened unless the option is set.

For TAP (option)

Enter with the accessory keyboard the size, actual hit count, and maximum hit count of a tap in the Tap gauge, Number of taps and Lives fields, respectively, and press the ↵ key.

If you press BACK during the data entry, the new values are not stored in the memory of the NC unit.

NOTICE

● When the installed taps reach their maximum hit count, an alarm is not displayed.   Periodically check their hit count on this display.

NOTE

● The data in the Number of taps and Lives fields cannot be changed or set during automatic operation.   If you have changed the data in these fields by mistake during automatic operation, press the ESC key.

UPDATE

Updates the hit counts of the taps to the latest data.

CLEAR

Clears the tap breakage information when a tap breakage alarm has occurred.

NOTICE

● Be sure to perform this operation after a tap change.

PUNCH

Opens the hit count management display for the punches.

TAP (option)

Opens the hit count management display for the taps.

NOTE

● The display is not opened unless the option is set.

CNC MAINTENANCE BUTTON

Pressed to open the CNC Maintenance display.

The CNC Maintenance display consists of PROGRAM MANAGE, SETTING, and MACRO VARIABLE, DNC PARAMETER and CNC SET.

PROGRAM MANAGE display

Reads, writes, and deletes a program in the CNC memory.

NOTE

● If the punching program uses a subprogram, the subprogram must be registered beforehand in the memory of the CNC unit using the Program Manage display.

C	O No	Comment	Size(Char.)	Update Time
	O9032	(NEXT JOB RACK M CODE)	180	2004/03/13 11:34
	O9041	(SUB PRO-C-3B)	1320	2005/02/07 10:36
■	O9042	(SUB 1)	420	2005/02/07 10:36
	O9043	(SUB 2)	420	2005/02/07 10:36
■	O9044	(SUB 3)	420	2005/02/07 10:36
	O9045	(SUB 4)	420	2005/02/07 10:36
■	O9200	(A38-NCT-G05-B-8B)	240	2005/02/07 10:42
	O9201	(NCT-G06-F-2B)	900	2004/10/01 20:07
	O9204	(A38-NCT-G10-A-5B)	840	2005/02/07 14:23
	O9216	(NCT-G50-A-1B)	240	2004/03/13 11:34

CNC MAINTENANCE — Program Manage — Program(Num) Memory(Char) — Used 58 34140 — Free 142 97020

READ   PUNCH   DELETE   RS232C READ   SELECT ALL

PROGRAM MANAGE   SETTING   MACRO   DNC PARA-METER   CNC SET   BACK

READ

Reads a program to the CNC memory.

Press READ to open the File selection display.

NOTE

● The floppy disk is selected by default as call-from media on the File selection display.

● Register the programs under the O numbers O0100 to O7999.   The O numbers O0001 to O0099 are used by the application for schedule operation, for example.   If a program is registered under an O number from O0001 to O0099, it may be overwritten or deleted.

●Press the READ button to refer to the floppy disk.　To refer to another media, press the CANCEL button, and operate from the following display:
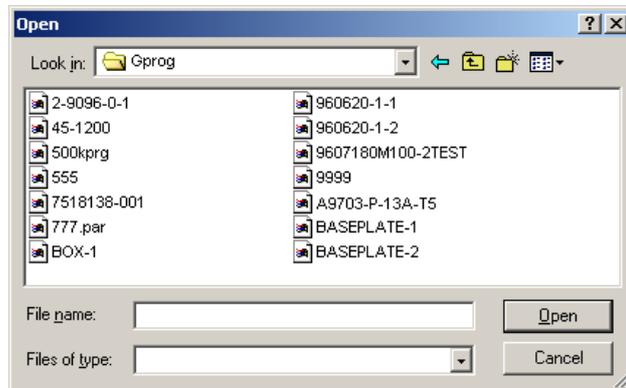
PUNCH

Writes a program from the CNC memory.

Press PUNCH to open the File selection display.

● Register the programs under the O numbers O0100 to O7999.　The O numbers O0001 to O0099 are used by the application for schedule operation, for example.　If a program is registered under an O number from O0001 to O0099, it may be overwritten or deleted.

● Press the PUNCH button to refer to the floppy disk.　To refer to another media, press the CANCEL button, and operate from the following display:

DELETE

Deletes a program from the memory of the CNC memory.

Select the program to delete, and press the button.

RS232C READ

Registers a program or programs in the CNC unit through the RS232C interface in the electrical control cabinet.

SELECT ALL

Selects all programs.

File reading procedure

Set the following five items: EDIT mode, NC reset, no NC alarm, TV check disabled, and EDIT PROTECT keyswitch turned to OFF.

1 Press READ.
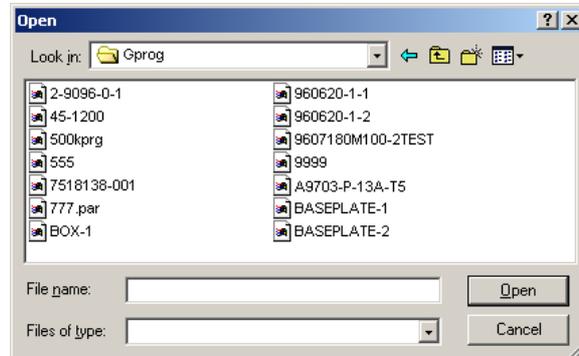
Open: Changes to the O NUMBER SET display.
Cancel: Stops the read operation without reading any program.

2 Select the program to read to the CNC memory, and press Open.

3 Set the read-to location in the CNC memory, and press OK.
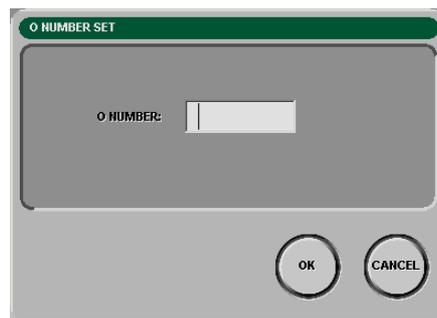
O NUMBER: Enters the O number under which to save the program in the CNC memory.

OK: Starts reading the program to the CNC memory.

CANCEL: Stops the read operation without reading the program.

NOTE

● If you press OK without entering the O number, the O number is detected from the file and read to the CNC memory.

● If a number is already entered in the O NUMBER field, the program is read to the NC memory under the specified O number. If the file has two or more programs, judge the beginning of the programs by O △ △ △ △ in the program statement after O x x x x at the beginning of the file.

File writing procedure

Set the following five items: EDIT mode, NC reset, no NC alarm, TV check disabled, and EDIT PROTECT keyswitch turned to OFF.

   1   Select the program to write to the PC.

   2   Press PUNCH.
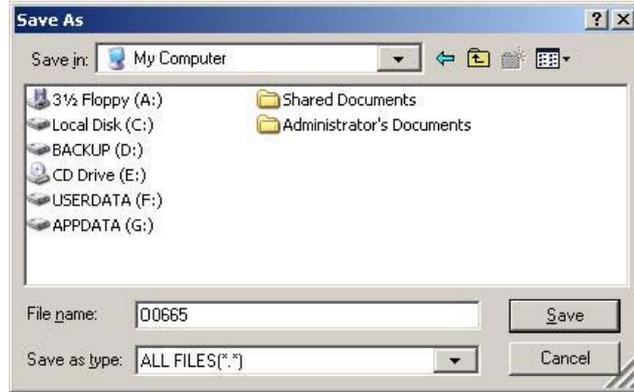
   File name: Enters the file name under which to save the program in the PC.　A smaller O number selected by default is displayed.
   Save: Starts writing the program to the PC.
   Cancel: Stops the write operation without writing any program.

   3   Set the write-to location of the PC, and press Save.

     NOTE

● Do not select "Local Disk (C:), "BACKUP (D:)", or "Removal Disk (H:)" as save-to location.

SETTING display

Sets such items as the number of worksheets to be processed, number of worksheets already processed, operating time, current date and time, and number of workclamps to be used.

Select the field to set, enter with the accessory keyboard the necessary value in the field, and press the ↵ key.

NOTE

● If you press BACK while changing from one entry field to another, the new value is not stored in the memory of the NC unit.

● The values in the highlighted fields on the Setting display are updated in real time, but cannot be changed.

● If the number of workclamps installed on the machine does not agree with the number of workclamps shown on the Setting display, the alarm message "1150 CLAMP POSITION READ ERROR" appears on the screen.

● Set the "The number of clamps" field to "0" to use short workclamps.

Clamp lever looseness detection cancel function

● This function is an emergency one.   As soon as the clamp looseness detection sensor fails or its cable breaks, remove the cause.

1   When the clamp lever loosens or the clamp lever looseness detection sensor fails, the alarm "CLAMP LEVER IS LOOSE" occurs.

2   Check the cause of the alarm.

3   When the cause is the failure of the clamp lever looseness detection sensor or the breakage of its cable, the operation cannot start.   You can punch the worksheet in an emergency by making the following setting.

4   Press the MAINT., CNC MAINTENANCE, and SETTING buttons to open the SETTING display.

5   Set the "Clamp lever detection cancel" field to "1".

NOTICE

● Usually keep the "Clamp lever detection cancel" field set to "0".

6   When this setting is changed, the following warning appears for a few seconds.   It also appears at the start of the program.

2197   CLAMP LEVER DETECTION CANCEL

NOTICE

● When the clamp lever looseness detection function is disabled, check the position of the workclamps every punching operation so that the workclamps are not punched.

MACRO VARIABLE display

Shows and updates macro variables and the like.

MACRO

1 to 999: Custom macro variables

1000 to 9999: System variables

P-MACRO

10000 to 19999: P-code variables

NO: A variable number

DATA: Value corresponding to the variable number.　Click the variable value to change it.　When you select the next item, the new variable value is stored in the memory of the NC unit.

Scroll bar

Changes from one page to another.

SEARCH

Searches for the variable number shown in the field, and lists the variables of that number.

DNC PARAMETER display

Selects and sets the input devices.

The RS232C interface to be set here is the RS232C interface in the electrical control cabinet.

INPUT DEVICE (synchronized with I/O Channel on Setting display)

0: Handy file

1: RS232C

3: Remote buffer

4: Floppy disk (default)

Set each item to suit the input device to be used.

NOTE

● After setting a parameter shown yellow on the display, turn off the power and then turn it back on.

CNC SET display

Checks the various parameters and resets the PS alarms (100 and 101).
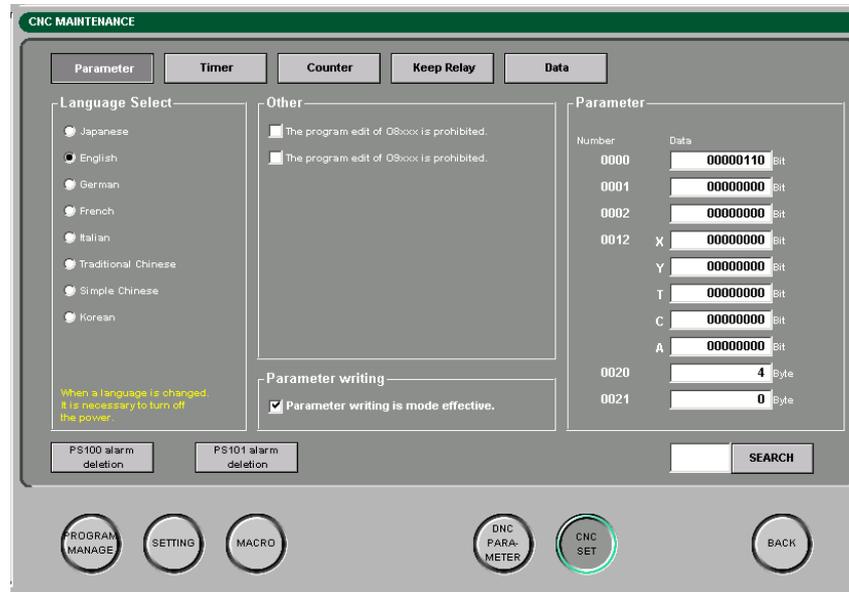
Parameter button

Checks the selected language and various parameters.
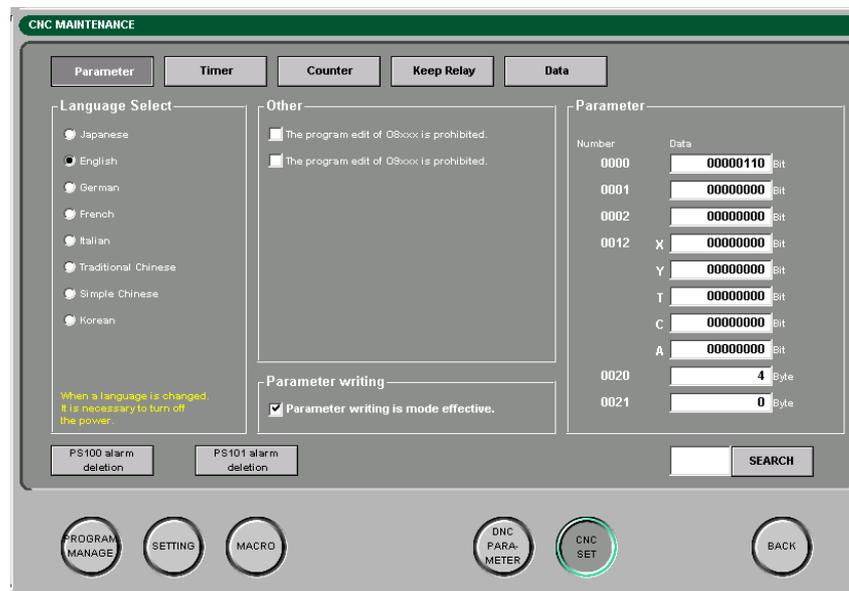
PS 100 alarm deletion button

Clears alarm No. 100 "PARAMETER WRITE ENABLE".

The parameter write field on the SETTING display is set to "1" to enable the writing of parameters.   Change the field to "0", and press the button to clear the alarm.

PS101 alarm deletion button

Clears alarm No. 101 "PLEASE CLEAR MEMORY".

Clearing the alarm deletes the program being edited.   Reregister the deleted program.

Timer button

Checks the timer.
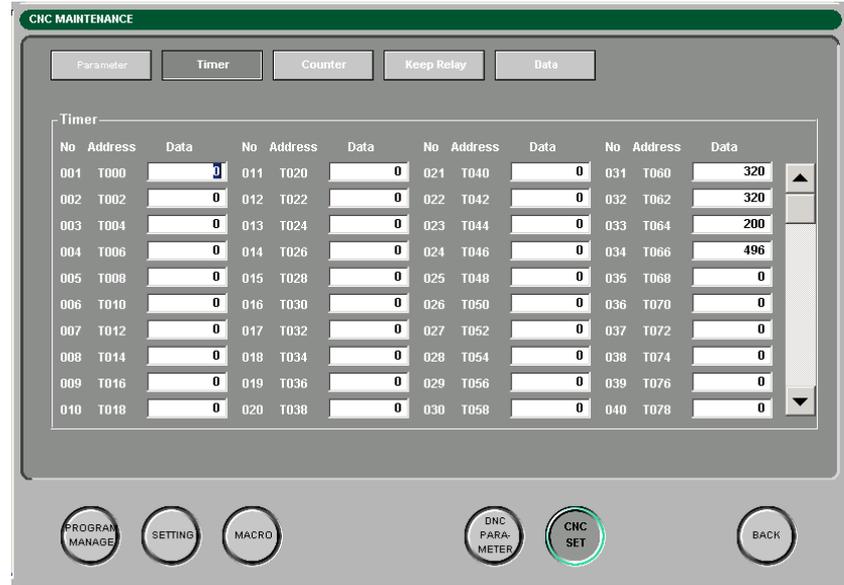
Counter button

Checks the counter.
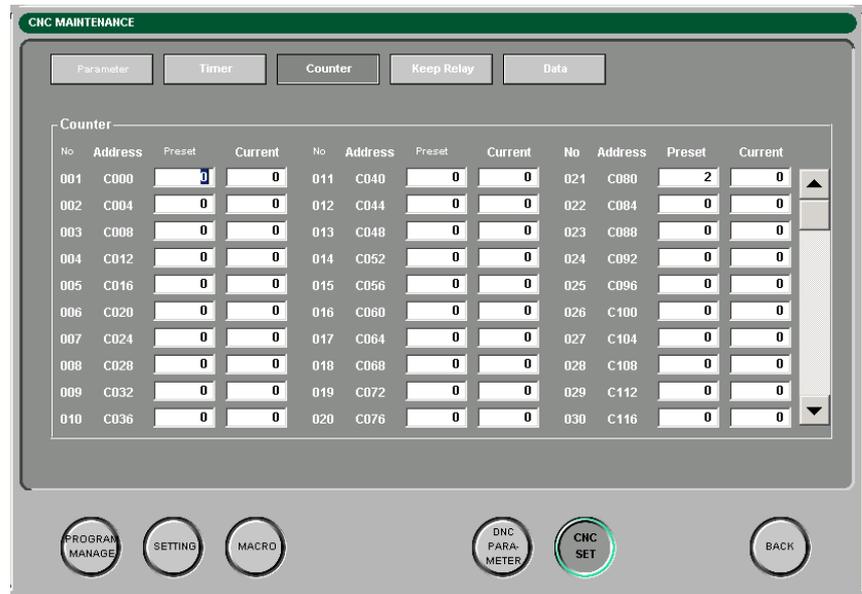
Keep Relay button

Checks the keep relay.
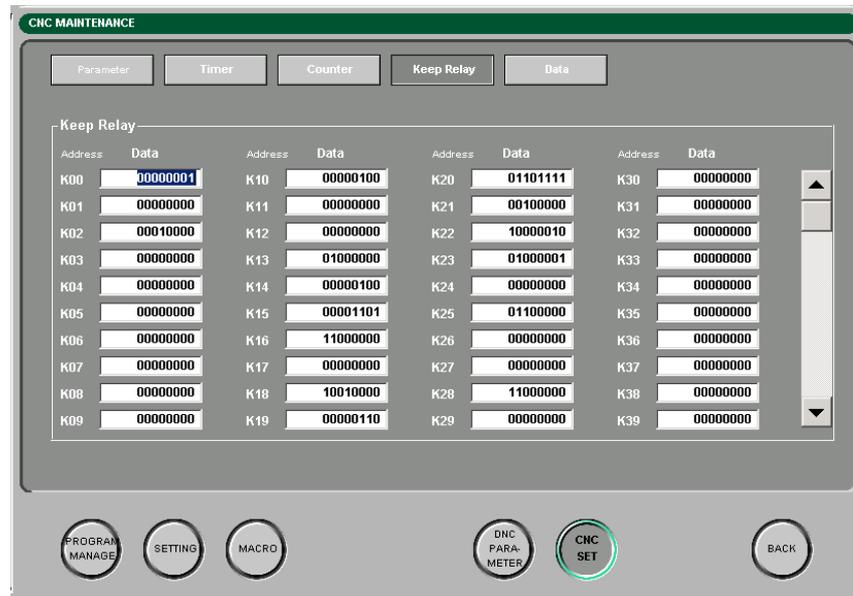
Date button

Checks the data.
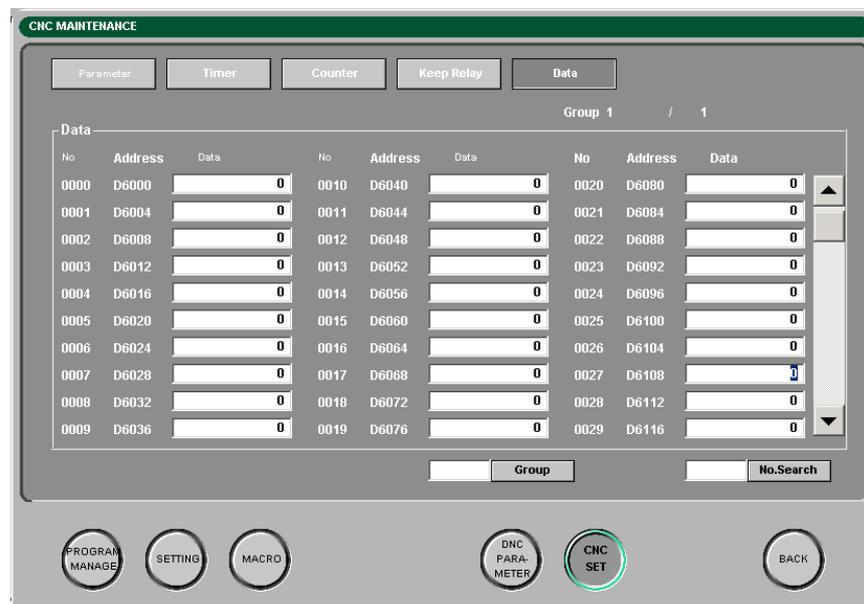
E-MAIL NOTICE FUNCTION BUTTON

The e-mail notice function can be used when the machine is operated in the network environment and the user has an e-mail account (or access right to the mail server).

The e-mail notice function allows you to remotely see the progress of your job, check whether and why the machine is operating or stopped, and send an attached file for maintenance purposes.

Program

Check the "End" check box to send e-mail at the end of the operation.

Schedule

Check the "End" check box to send e-mail at the end of the schedule and the "Job End" check box to send e-mail at the end of the job.

STOP

Check the "It is informed if the next time passes" check box to send e-mail at the specified time after the stop of the machine.

Power

Check the "Off" check box to send e-mail when the power of the machine is turned off.

START button

Enables the e-mail notice function.   When the e-mail notice function is enabled, the e-mail mark is shown at the lower right of the display.
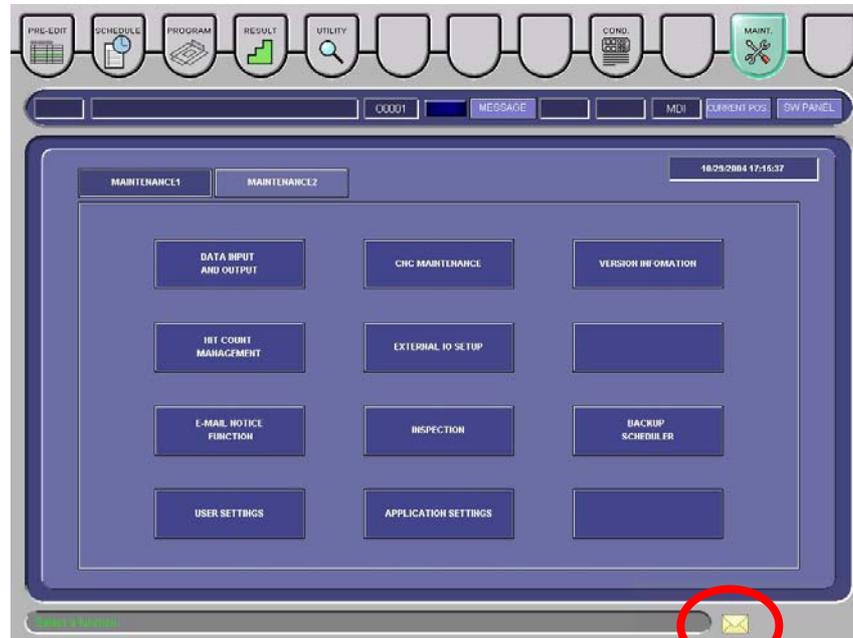
E-mail notice function enabled

STOP button

Disables the e-mail notice function.   (When the e-mail notice function is enabled, the STOP button is shown in place of the START button.)

SETUP button

Opens the Setup of E-mail Notice display.

Transmitting E-mail server (SMTP) field
Shows the SMTP server name or IP address.

"Authentication is necessary for this server" check box
Check when the MTA requires SMTP authentication.

LOGIN SETUP button
Opens the account name and password entry display.

"A dialup connection is used" check box
Check to use the dialup connection.

CONNECT SETUP button
Opens the dialup connection setup display.

DETAILS button
Used to change the port number used for sending the E-mail.

Sender Name field
Shows the name or other item to identify the sender (NC).

Sender E-mail Address field
Shows the e-mail address to identify the sender (NC).

Address list

Lists the e-mail addresses.

ADDITION button

Adds an e-mail address to the e-mail address list.

DELETE button

Deletes the e-mail address selected in the e-mail address list.

ADDRESS BOOK button

Opens the Address Book display.
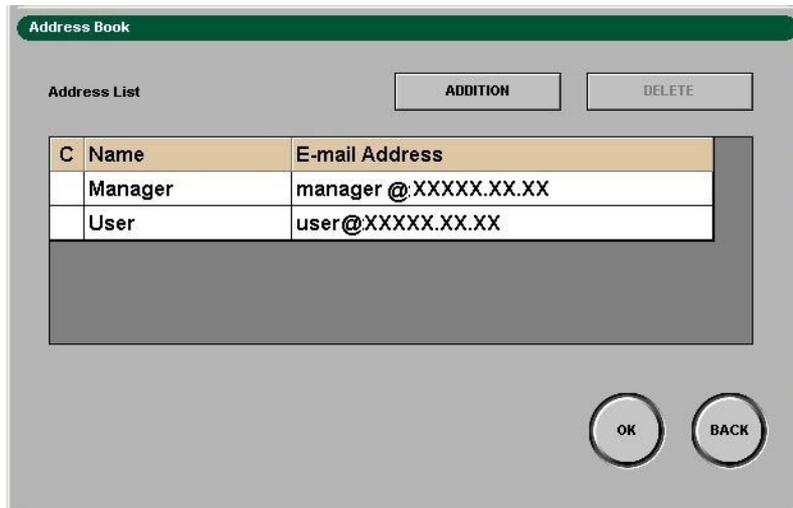
The e-mail address or addresses selected on the Address Book display are added to the e-mail address list.

NOTICE

● Set each item to suit your operating environment.

Archive method of appending a file

Selects a method for compressing the appended file when creating application data.   LZH is selected by default.

OK button

Saves the change or changes made and closes the E-mail Notice Function display.

BACK

Closes the E-mail Notice Function display.

MAIL button

Opens the E-mail Transmission display.   This display is used to send normal e-mail.

From field
Shows the sender of the e-mail to be sent.

Name field
Shows the name to identify the sender (NC).

E-mail Address field
Shows the e-mail address to identify the sender (NC).

E-mail address list
Lists the e-mail addresses.

To ADDITION button
Adds an e-mail address to the e-mail address list.

To DELETE button
Deletes the e-mail address selected in the e-mail address list.

To ADDRESS BOOK button
Opens the Address Book display.

Subject/message fields
Enter the subject and message.

Attached file list

Lists the attached files.

Attached file DELETE button

Cancels the file selected in the attached file list.

Attached file REFERENCE button

Opens the file selection display and adds an attached file to the attached file list.

Attached file APPLI DATA button

Selects the type of file to attach to the e-mail.

SEND button

Sends the e-mail.

BACK button

Closes the E-mail Transmission display.

OK button

Saves the change or changes made and closes the E-mail Notice Function display.

BACK button

Closes the E-mail Notice Function display.

APPLI DATA button

Opens the Application Data display.   When a check box is checked,
the log, setup, and other files of the related application can be attached
to the e-mail.   When such files are attached to the e-mail by using the
application data function, the version information of the Maintenance
display is attached to the text of the e-mail.

Machine information

Part punching data is selected for attaching to the e-mail.

Alarm information

Alarm condition and history is selected for attaching to the e-mail.

Application information

Data about AMNC-F is selected for attaching to the e-mail.

System information

Data about Windows is selected for attaching to the e-mail.

Details button

Opens Detailed setup field on the display.

OK button

Attaches the selected application data.

BACK button

Closes the Application Data display without reflecting the settings.

Press the Details button to directly specify the application data you want to attach to the e-mail.

Simple button

Close Detailed set up field on the display.

Current Program

Currently selected program and its additional information

Current Schedule

Current schedule list information (CSV file)

Actual result
Actual result data file (binary file)

Macro variable
Custom macro and P code variables

PHNC Info
Press M codes, PHNC tools, and PHNC parameters

Turret Info
Turret information data file

Alarm history
AMNC-F log history

I/O Info
I/O information output file

FANUC diagnostics
FANUC diagnostics output file

AMNC Log
AMNC-F log file

FANUC Log
FANUC log file

User/Appli Setting
INI file used in the AMNC-F

Crash dumping
PC memory information file

Dr. Watson Log
PC error log file

INSPECTION BUTTON

Sets the inspection period of an inspection items (e.g., filter cleaning or lubrication), and produces an alarm or warning when the inspection period is exceeded.

Select the Item Name field you want to set, and press the PERIOD field.

Select the setup period, and press the ENTER key to set the period.

To cancel the entry during the selection, press the ESC key.

COMPLETE button

Pressed at the end of the inspection task to update the last inspection date and clear the overdue.

BACK button

Closes the INSPECTION display.

NOTE

● The Period field is set to "None" at the time of factory shipment.   Set this field as required.

● For each inspection item, refer to Part VIII, Maintenance.

● No warming occurs if "None" or "0" is selected in Period.

ITEM CHECKLIST

Item Name	Period	Default	Setting method
Cleaning of machine	Every Day	None	Select None, Every Day, Every Week, 1 Month, 3 Month, 6 Month, or 1 Year.
Daily lubrication	Every Day	None	Select None, Every Day, Every Week, 1 Month, 3 Month, 6 Month, or 1 Year.
Check of air systems	Every Day	None	Select None, Every Day, Every Week, 1 Month, 3 Month, 6 Month, or 1 Year.
Maintenance of tool	Every Day	None	Select None, Every Day, Every Week, 1 Month, 3 Month, 6 Month, or 1 Year.
Check of cooling tower (Option)	Every Day	None	Not used.
Every Week lubrication	1 week	None	Select None, Every Day, Every Week, 1 Month, 3 Month, 6 Month, or 1 Year.
Every Month lubrication	1 Month	None	Select None, Every Day, Every Week, 1 Month, 3 Month, 6 Month, or 1 Year.
Check of lubrication	1 Month	None	Select None, Every Day, Every Week, 1 Month, 3 Month, 6 Month, or 1 Year.
Cleaning of NC air filter	1 Month	None	Select None, Every Day, Every Week, 1 Month, 3 Month, 6 Month, or 1 Year.
Change of cooling water unit	1 Month	None	Select None, Every Day, Every Week, 1 Month, 3 Month, 6 Month, or 1 Year.
Every 3 Months lubrication	3 Month	None	Select None, Every Day, Every Week, 1 Month, 3 Month, 6 Month, or 1 Year.
Change of hydraulic oil (VIPROS)	2000 hours	0	Not used.
Check of hydraulic accumulator	6 Month	None	Not used.
Change of battery	1 Year	None	Select None, Every Day, Every Week, 1 Month, 3 Month, 6 Month, or 1 Year.
Auto Grease Lubricator residual quantity [%]	%	0	Input an integer from 0 to 100.

NOTE

● For details of item check, refer to Part VIII, Maintenance.

Use examples of INSPECTION display

INSPECTION

C	Item Name	Period	Lastday	Nextday	Interval
	Cleaning of machine	Every Day	2003/11/08	2003/11/09	2Days
	Daily lubrication	Every Day	2003/11/08	2003/11/09	2Days
	Check of air systems	Every Day	2003/11/08	2003/11/09	2Days
	Maintenance of tool	Every Day	2003/11/08	2003/11/09	2Days
	Check of cooling tower(Option)	None	2003/11/08		2Days
	Every week lubrication	Every Week	2003/11/08	2003/11/15	2Days
	Every month lubrication	1 Month	2003/11/08	2003/12/08	2Days
	Check of lubrication	1 Month	2003/11/08	2003/12/08	2Days
	Cleaning of NC air filter	1 Month	2003/11/08	2003/12/08	2Days
	Change of cooling water unit	None	2003/11/08		2Days

☐ When excess of time displays at the time of starting.

[COMPLETE]

[BACK]

An overdue inspection item is shown red.   Be sure to inspect the machine according to the items shown on the INSPECTION display.

INSPECTION

C	Item Name	Period	Lastday	Nextday	Interval
■	Cleaning of machine	Every Day	2003/11/08	2003/11/09	2Days
■	Daily lubrication	Every Day	2003/11/08	2003/11/09	2Days
■	Check of air systems	Every Day	2003/11/08	2003/11/09	2Days
	Maintenance of tool	Every Day	2003/11/08	2003/11/09	2Days
	Check of cooling tower(Option)	None	2003/11/08		2Days
	Every week lubrication	Every Week	2003/11/08	2003/11/15	2Days
	Every month lubrication	1 Month	2003/11/08	2003/12/08	2Days
	Check of lubrication	1 Month	2003/11/08	2003/12/08	2Days
	Cleaning of NC air filter	1 Month	2003/11/08	2003/12/08	2Days
	Change of cooling water unit	None	2003/11/08		2Days

☐ When excess of time displays at the time of starting.

[COMPLETE]

[BACK]

Select an inspection item, and press the COMPLETE button.

Message center

Does it complete [Cleaning of machine] ?

[YES]   [NO]

Press YES.

If there is any overdue inspection item, it is indicated by an icon at the lower right of the display.   The icon disappears when all inspection items are finished to leave no overdue inspection items.

BACKUP SCHEDULER BUTTON

The Backup Scheduler display is used to periodically or manually save the data characteristic of your machine in a flash memory card or restore the data from the flash memory card.   If you save the machine data in the flash memory card in this way and the machine data is damaged later, you can restore the machine data close to the condition before the damage.

The backup scheduler has three functions: automatic backup, manual backup, and manual restore.
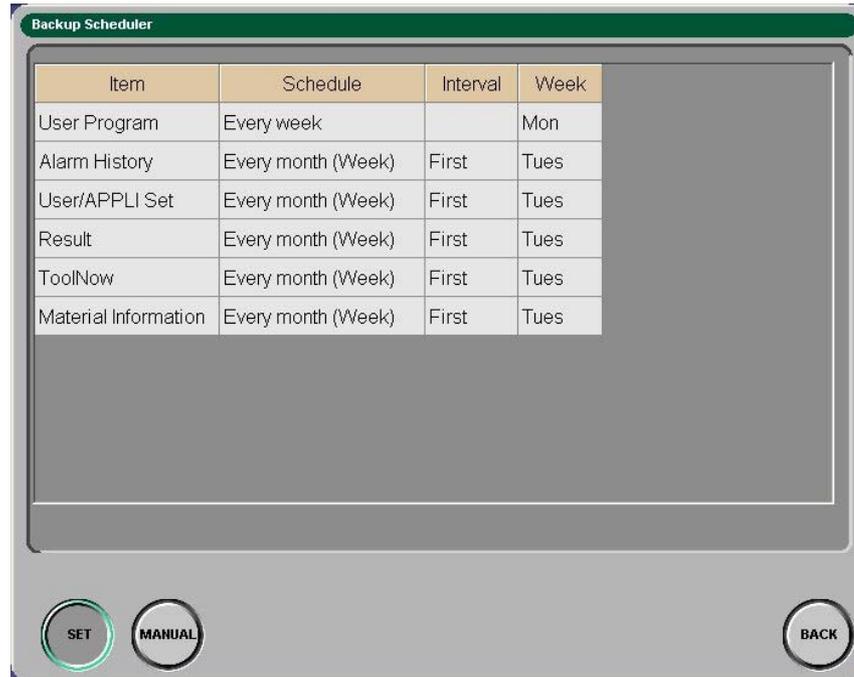
Backup Scheduler

Item	Schedule	Interval	Week
User Program	Every week		Mon
Alarm History	Every month (Week)	First	Tues
User/APPLI Set	Every month (Week)	First	Tues
Result	Every month (Week)	First	Tues
ToolNow	Every month (Week)	First	Tues
Material Information	Every month (Week)	First	Tues

SET   MANUAL   BACK

SET button

Opens the display for making the automatic save settings.

MANUAL button

Opens the display for manually saving or restoring the machine data.

BACK button

Closes the Backup Scheduler display.

Automatic backup

When the machine data reaches the specified date, it is automatically backed up.

Item	Schedule	Interval	Week
User Program	Every week		Mon
Alarm History	Every month (Week)	First ▼	Tues
User/APPLI Set	Every month (Week)	First	es
Result	Every month (Week)	Second	es
ToolNow	Every month (Week)	Third	es
Material Information	Every month (Week)	Fourth	es
		Fifth	
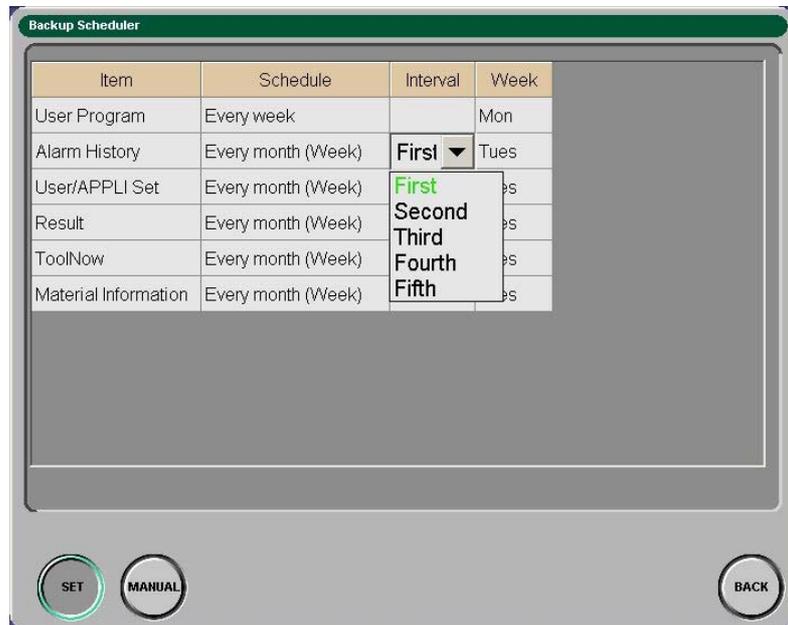
Set the Schedule, Interval, and Week fields.

Manual backup

When you want to save the machine data, specify the data item to back up, and back it up.

Back up such data items as not shown on the automatic backup display.

This function is enabled only when the machine is stopped in emergency.

Manual restore

This function is used for maintenance by AMADA.   Normally, it is not used by the operator.

Use example of Backup Scheduler display

Select the data you want to back up or delete.

SAVE

Backs up the selected data.

PRESERVE

This function is used for maintenance by AMADA.   Normally, it is not used by the operator.

DELETE

Deletes the selected data.

The backup scheduler condition is indicated by an icon at the lower right of the display.

There is data whose backup is overdue.

Automatic backup has failed.

An item to restore is set.   It will be restored at the next startup.

EXTERNAL IO SETUP BUTTON

External IO is the transfer of programs between the main control panel and the external device connected to the PANEL i serial port at the lower rear of the main control box through the RS232C interface.   The port that can be set on the External IO Setup display is the PANEL i serial port but not the CNC unit serial port in the electrical control cabinet.

External IO setup consists of selecting the setting to be used for data IO and setting the RS232C communication.
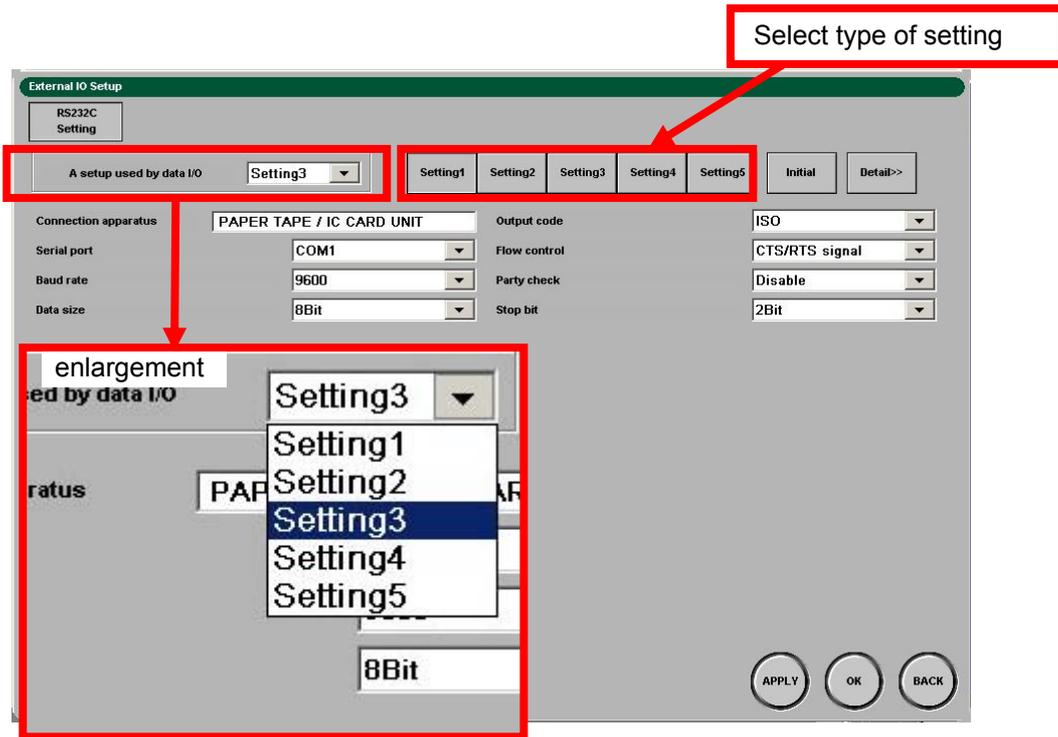
A setup used by data I/O

Select the setting item to be used for the data IO serial port from among settings 1 to 5.

Setting selection buttons

Show and change the details of the selected setting number.

APPLY button

Updates the changed details of the selected setting number.

Initial button

Returns the selected setting to the initial value at the time of factory shipment.   Press OK on the Initial value setup display to do so.

Initial value setup

The contents of a setup chosen now are
returned to the value at the time of
factory shipments.
Is it very well?

OK   CANCEL
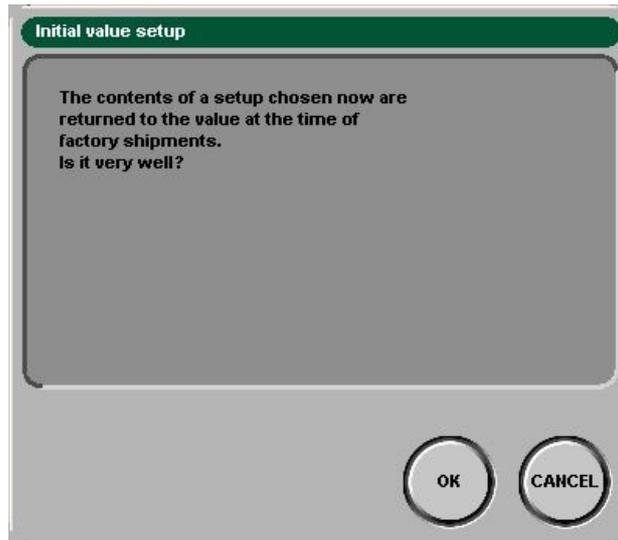
OK button

Updates the changed details and closes the External IO Setup display.

BACK button

Closes the External IO Setup display.

VERSION INFORMATION BUTTON

Pressed to open the VERSION INFO display.

The software version which consists NC is shown on the display.

```
VERSION INFO

NC SYSTEM        B7H1-0008
PMC LADDER       AF00-00TA
PMC-C LANG       RC03-0001
MACRO EXE         E09-0004
C EXE            MMIB-0202
HMI APL          AF1.04.07

   PARAM              DETAILS    BACK
```
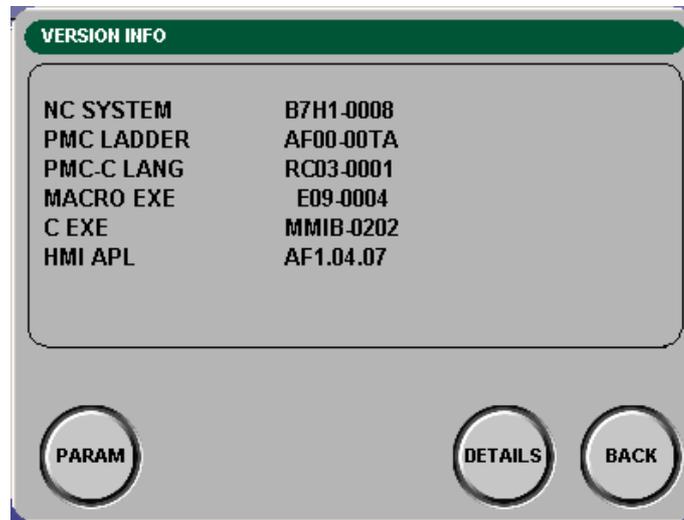
BACK button

Closes the VERSION INFO display.

DETAILS button

Pressed to open the DETAIL OF VERSION display.   The modules which consist software are shown on the display.

```
DETAILS OF VERSION

| NAME                 | VERSION  |
| Physical slot number | 00 09 0A |
| Logical slot number  | 00 08 01 |
| Module ID-1          | 13068    |
| Module ID-2          | 29098    |
| Module ID-3          | 224      |
| Module ID-4          |          |
| Module ID-5          |          |
| Module ID-6          |          |

                              BACK
```
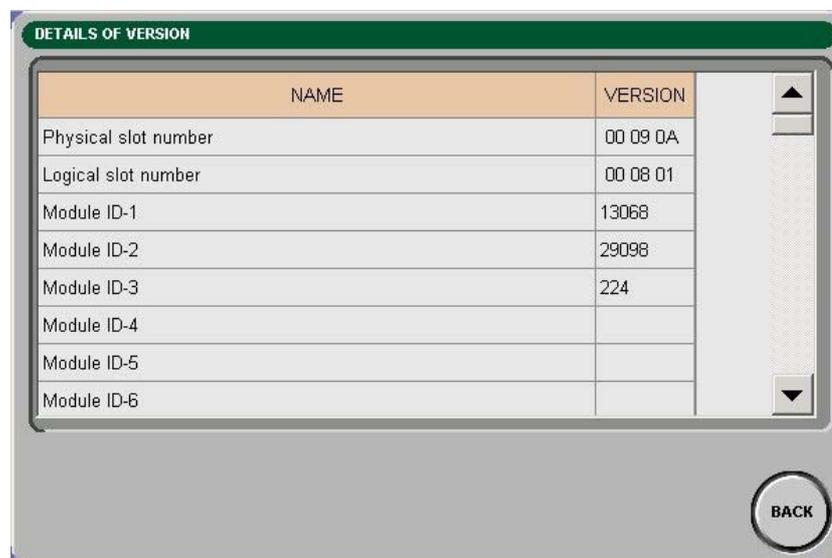
BACK: Closes the DETAILS OF VERSION display.

PARAM button

Pressed to open the PARAMETER VERSION display.   Versions of various parameters are shown on the display.
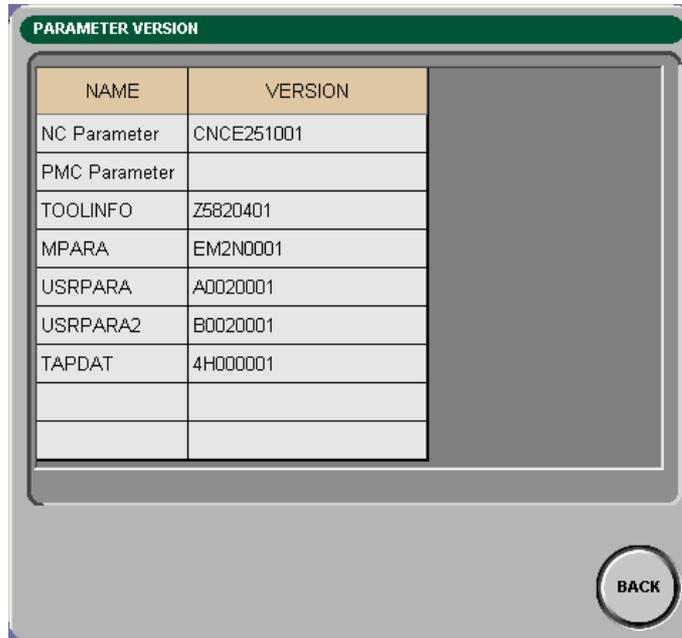
NAME	VERSION
NC Parameter	CNCE251001
PMC Parameter	
TOOLINFO	Z5820401
MPARA	EM2N0001
USRPARA	A0020001
USRPARA2	B0020001
TAPDAT	4H000001

PARAMETER VERSION

BACK

BACK: Closes the PARAMETER VERSION display.

LANGUAGE SETTINGS DISPLAY

Selects the display language.
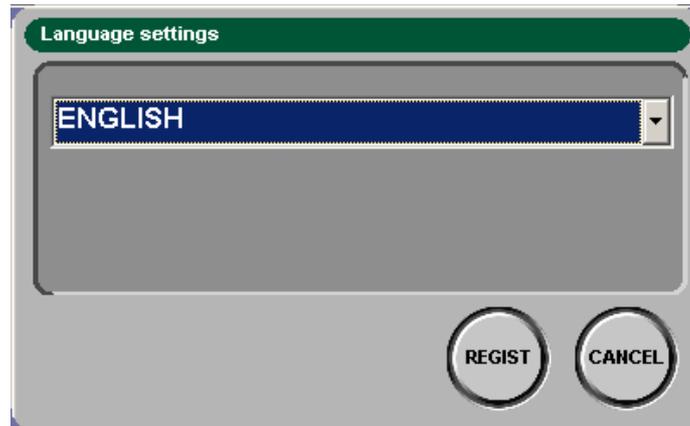
Language settings
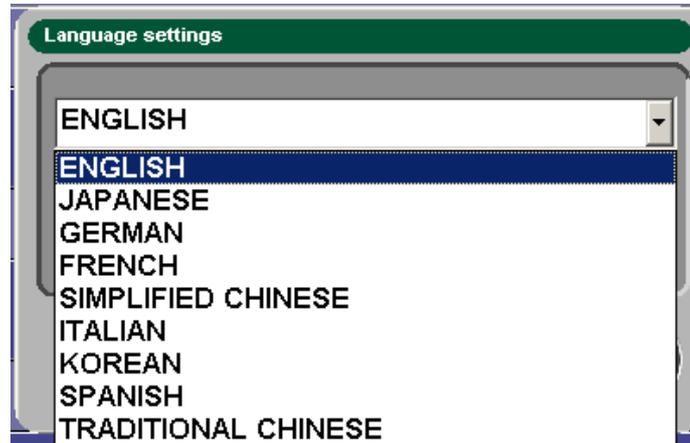
Select your display language.

REGIST button

Changes to the selected language.

CANCEL button

Closes the Language settings display.

Display usage example

Language settings

ENGLISH ▼

ENGLISH
JAPANESE
GERMAN
FRENCH
SIMPLIFIED CHINESE
ITALIAN
KOREAN
SPANISH
TRADITIONAL CHINESE
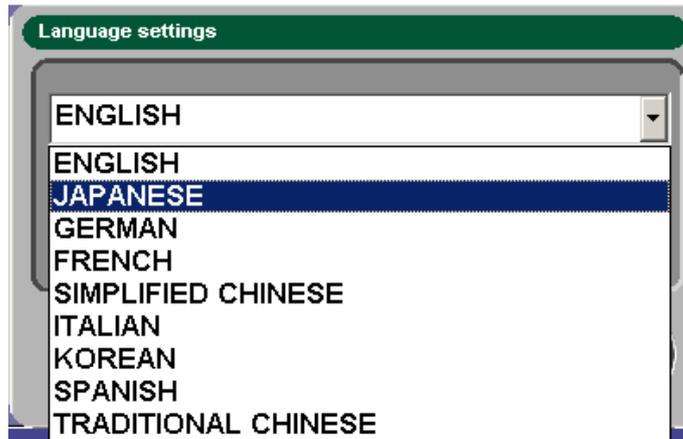
Select the language to which you want to change.

Language settings

JAPANESE ▼

(REGIST) (CANCEL)
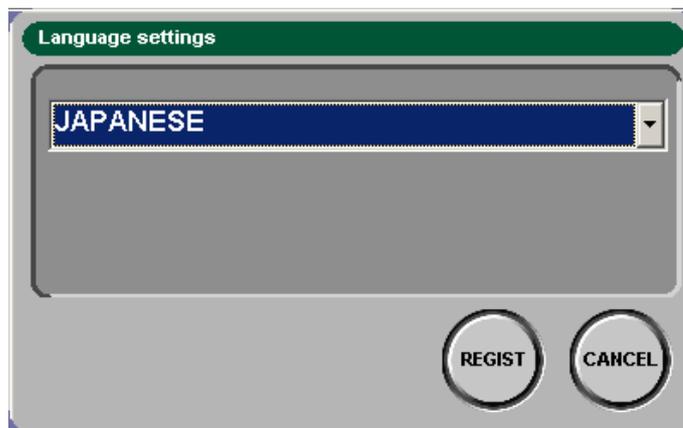
Press the REGIST button.

Message center

I have to cut off a power supply.
Are you all right?

(OK) (CANCEL)
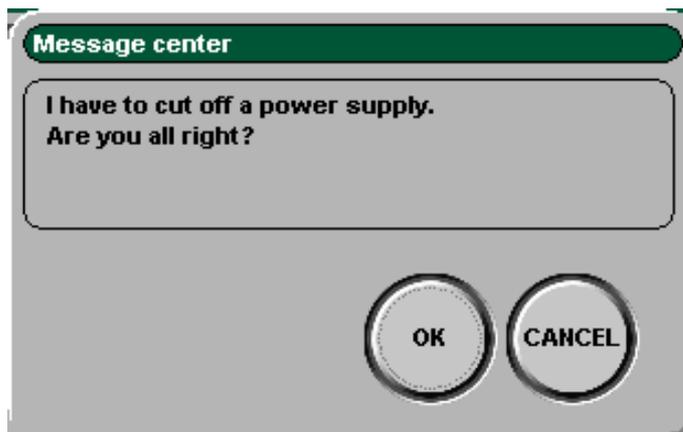
Press the OK button to confirm the registration.
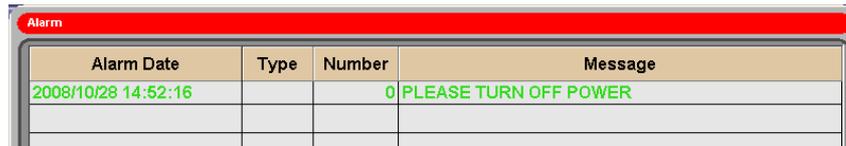
Alarm			
Alarm Date	Type	Number	Message
2008/10/28 14:52:16		0	PLEASE TURN OFF POWER

The message "PLEASE TURN OFF POWER" appears.

Press the OFF button to turn off the power to the NC unit.

Then press the ON button to turn back on the power to the NC unit.

EWF Write-enalbe

Do you restart Windows(R)?
It is necessary to restart so that you may execute AMNC.
Please cancel when you do various settings or AMNC installation/uninstallation.

OK   Cancel

The above window appears.

Press the OK button.   The Windows automatically restarts.

After its restart, the Windows changes to the new display language.

Part IV

Program Management

Common to EM series

CALLING PROGRAM OR PROGRAMS

PRE-EDIT display

OPEN button

Media selection buttons
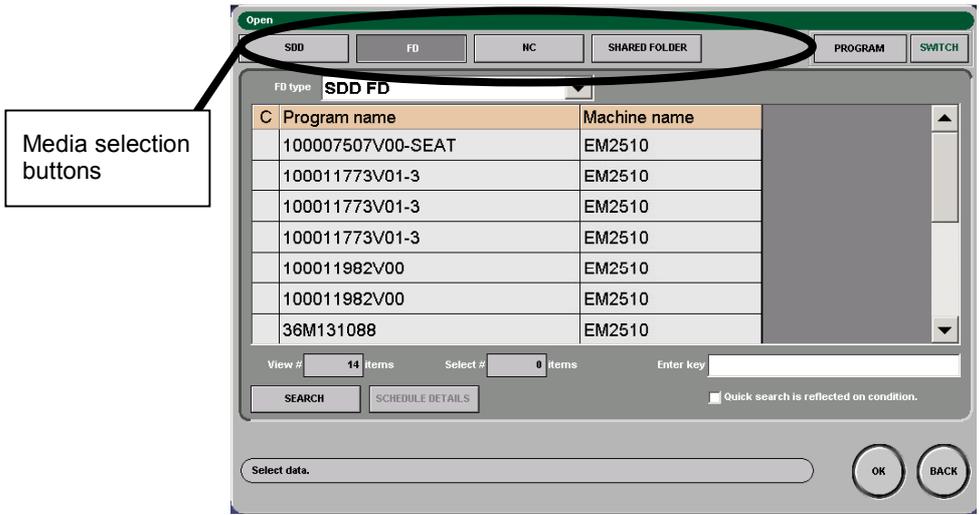
Call a program or programs to the PRE-EDIT display as described below.

NOTE

● When the automatic operating mode is PROGRAM, the program or programs cannot be called to the PRE-EDIT display unless the MEMORY button on the main control panel is pressed and illuminated.

1   Press the OPEN button on the PRE-EDIT display to show the OPEN display.

2   Select the call-from media with the media selection buttons.

3   Select the name of the program or names of the programs to call from the program list shown (multiple choice possible).

4   Press the OK button to call the program or programs to the PRE-EDIT display.

Buttons shown on Open display

SDD

Lists the programs saved in the SDD system.

FD

Lists the programs saved in the floppy disk.

NC

Lists the programs saved in the NC unit.

SHARED FOLDER

Lists the programs saved in the specified share folder.

SEARCH

Searches a program list for a program or programs.

SCHEDULE DETAILS

Displays the contents of each schedule.

Select the name of the schedule, and press the button.

This button is enabled only when the name of the schedule is shown.

SWITCH

Changes the listed data between the programs and schedules.

NOTE

● The SDD system is the data management system composed of Amada's automatic programming unit AP100 and data server ASIS100PCL.

● The programs are registered on the SCHEDULE display in the same sequence as they are selected.

SCHEDULE display
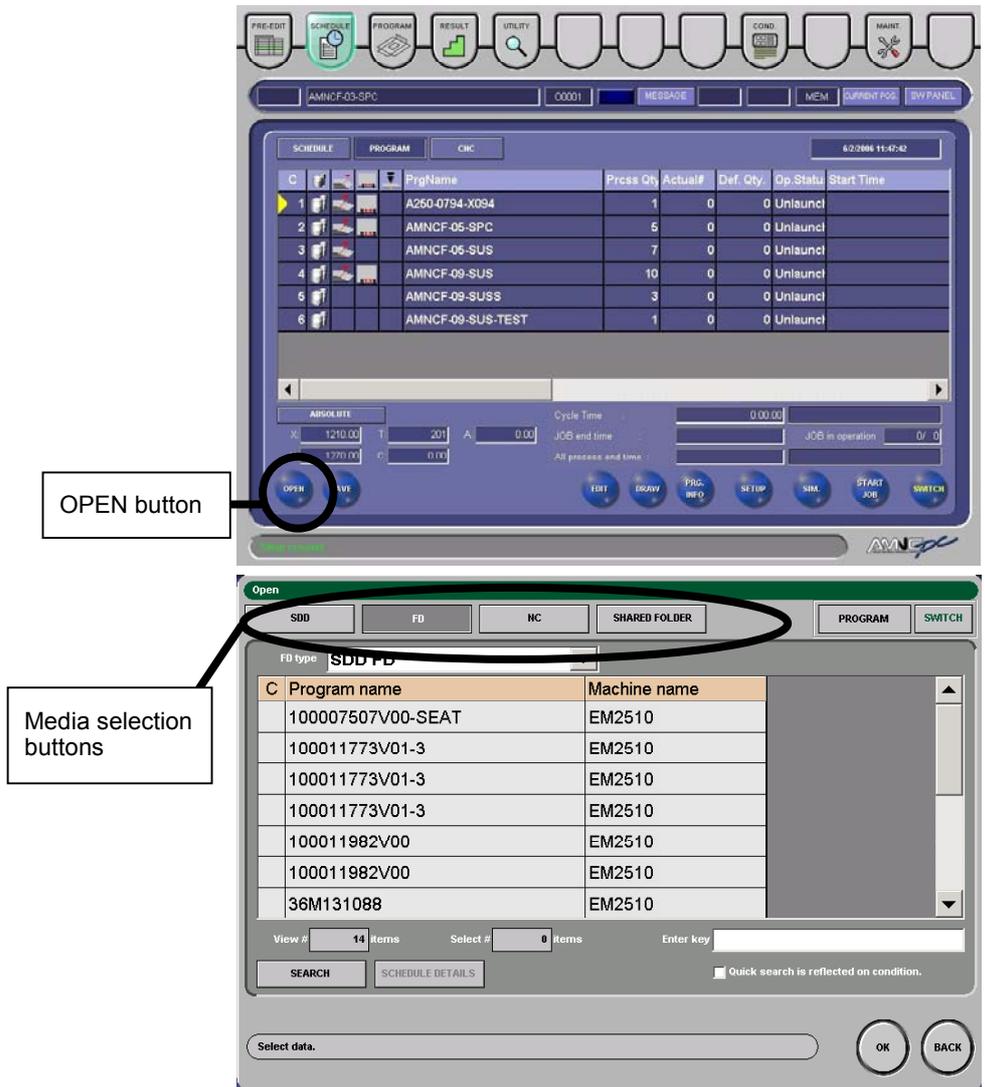
OPEN button

Media selection
buttons

Call a program or programs to the SCHEDULE display as described
below.

NOTE

● When the automatic operating mode is SCHEDULE, the program or programs
   cannot be called to the SCHEDULE display unless the MEMORY button on
   the main control panel is pressed and illuminated.

● The programs are registered on the SCHEDULE display in the same
   sequence as they are selected and called.

1 Press the OPEN button on the SCHEDULE display to show the
   Open display.

2 Select the call-from media with the media selection buttons.

3 Select the name of the program or names of the programs to call
   from the program list shown (multiple choice possible).

4 Press the OK button to call the program or programs to the
   SCHEDULE display.

PROGRAM display

OPEN button

Media selection buttons
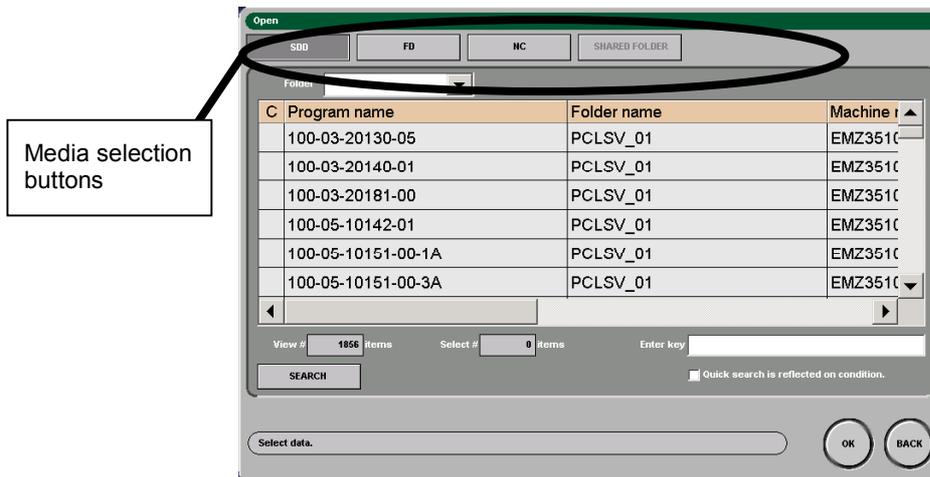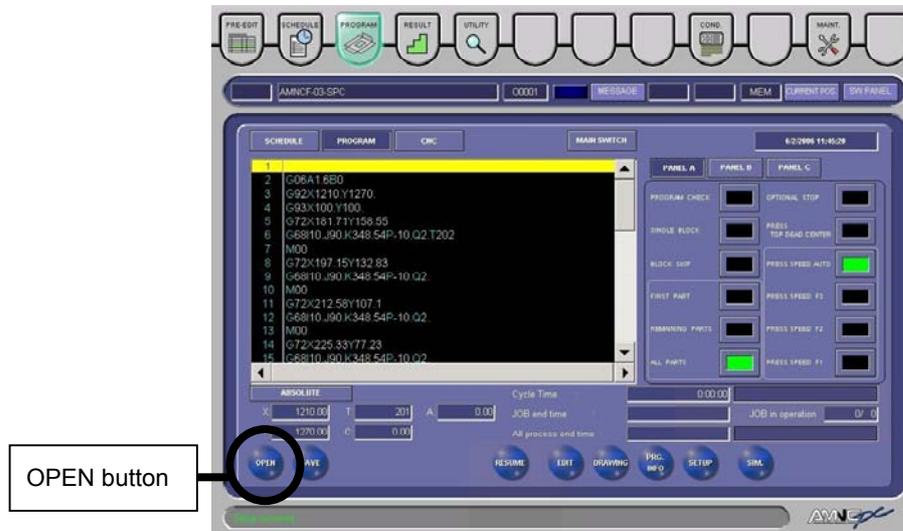
Call a program to the PROGRAM display as described below.

NOTE

● When the automatic operating mode is PROGRAM, the program cannot be called to the PROGRAM display unless the MEMORY button on the main control panel is pressed and illuminated.

1 Press the OPEN button on the PROGRAM display to show the Open display.

2 Select the call-from media with the media selection buttons.

3 Select the name of the program to call from the program list shown. (Multiple programs cannot be selected.)

4 Press the OK button to call the program to the PROGRAM display.

EDITING PROGRAM

You can edit a program called to the PRE-EDIT, SCHEDULE or PROGRAM display.   Use the accessory keyboard to enter, delete, and change the program data.

The program called to the PRE-EDIT display can be edited during the automatic operation of the machine.   It cannot be edited while it is being executed.

PRE-EDIT display menu

SCHEDULE display menu

PROGRAM display menu

Press the EDIT button in the menu of each display to show the EDIT display.

NOTE

● When you want to edit a program using the PRE-EDIT or SCHEDULE display, select the name of the program, and press the EDIT button.

Program name display area

Display change buttons
• SETUP
• G CODE

Draw area

Edit area

Edit command area
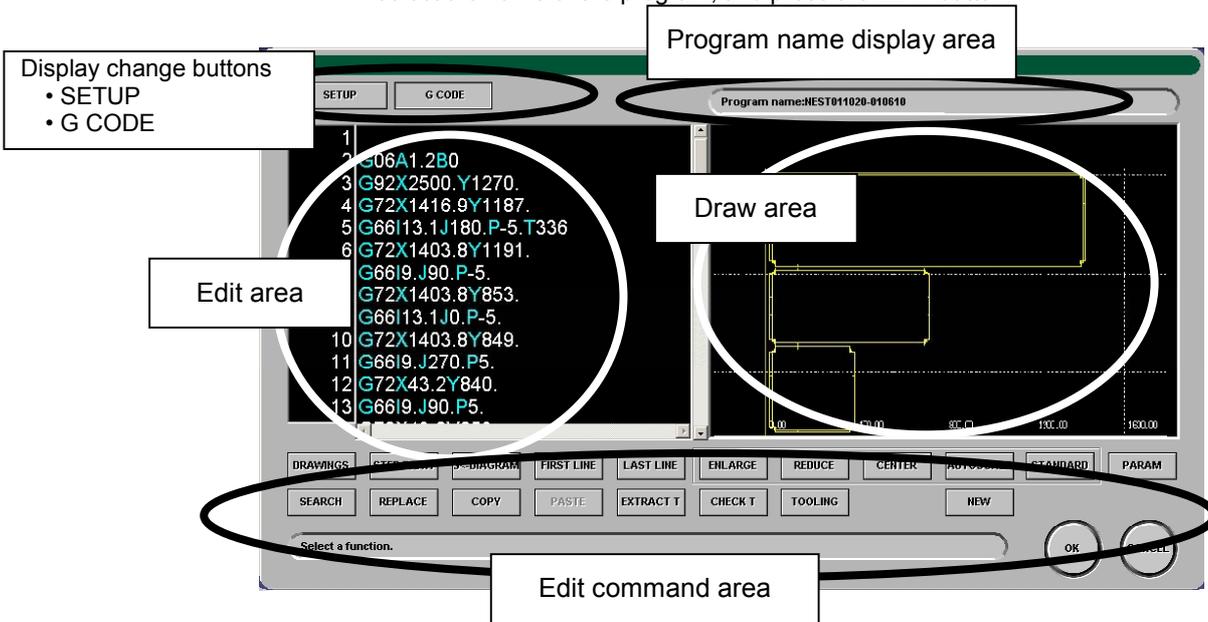
Buttons shown on EDIT display

DRAWINGS

Pressed to draw a part in the draw area according to the program shown in the edit area.

STEP DRAW

Pressed to draw a part in the draw area sequentially according to the blocks of the program shown in the edit area.

When the STEP DRAW button is pressed, the DRAWINGS button changes to the END DRAW button.   Press the END DRAW button to interrupt the step drawing.

G←DIAGRAM

Pressed to position the cursor at the program block that corresponds to the selected portion of the figure drawn in the draw area.

Press the button, and select the figure whose program block you want to check.

FIRST LINE

Pressed to position the cursor at the first line of the program shown in the edit area.

LAST LINE

Pressed to position the cursor at the last line of the program shown in the edit area.

ENLARGE

Pressed to enlarge the selected portion of the figure drawn in the draw area.

Press the button, and select the portion of the drawn figure to expand.

REDUCE

Pressed to reduce the selected portion of the figure drawn in the draw area.

The reduction is referenced to the center of the draw area.

CENTER

Press the button, and select the portion of the figure to place the selected portion at the center of the draw area.

AUTOSCALE

Pressed to draw a figure on an automatic scale.

STANDARD

Pressed to draw a figure in the reference position.

PARAM

Pressed to set the drawing conditions like color.

SEARCH

Pressed to show the Search display.

Enter the character string to search for, select the search direction ("Up" or "Down"), and press the SEARCH NEXT button.

Select "Up" to search in the upward direction from the current cursor position and "Down" to search in the downward direction from the current cursor position.

Press the SEARCH NEXT button to search for the next instance of the character string.
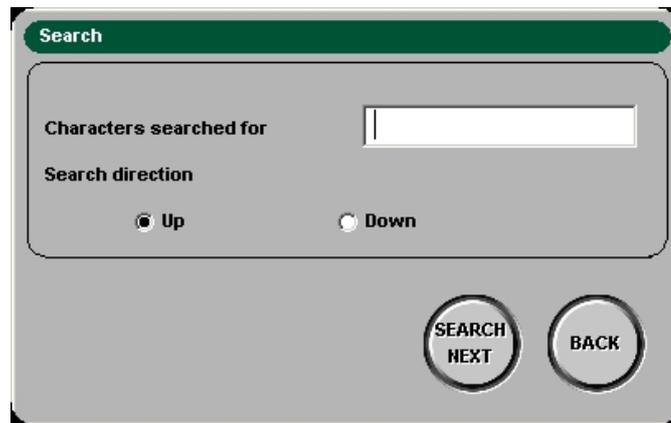
REPLACE

Pressed to show the Replace characters display.
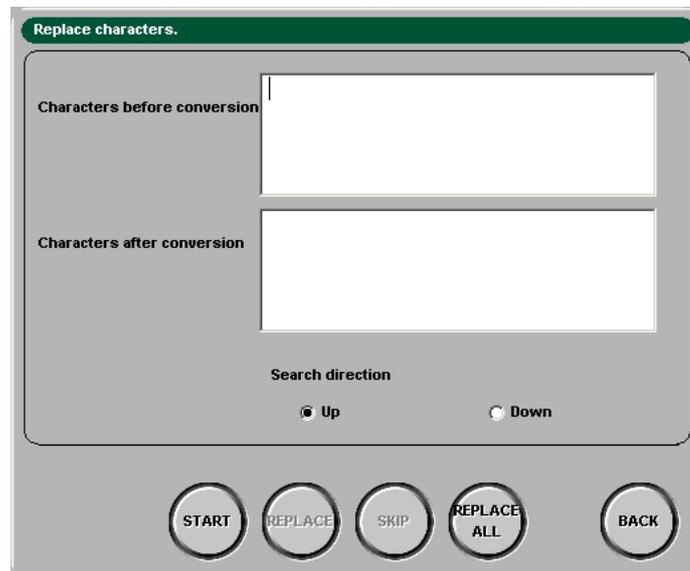
Enter the character string to find and the character string to replace with, and press the START button.

When the cursor reaches the first instance of the character string to replace, press the REPLACE button. You can skip some instances of the searched character string or can replace all instances of the searched character string.

COPY

Opens the Specify the line that you want to copy/cut display.

Enter the numbers of the first and last lines of the program blocks you want to copy from.

Press the COPY button to copy the G code to the destination line. Press the CUT button to copy the G code to the destination line and delete the G code in the source line.

PASTE

Pressed to paste the program blocks copied with the above copy command.

Select the line to copy the program blocks to, and press the button.

EXTRACT T

Pressed to extract the T-numbers used in the selected program.

Press the EXTRACT NUMBER button to extract the next T-number. Press the EDIT TOOL button to change the tool to be used.

CHECK T

Pressed to check that each T-number used in the selected program corresponds to the number of the turret station where each tool is installed.

TOOLING

Pressed to list the tools used in the selected program.

NEW

Pressed to create a new program.

G CODE

Pressed to display the contents of the selected program.

SETUP

Pressed to display the setup information of the selected program.

OK

Pressed to register the edited program to the PRE-EDIT display.

NOTE

● The program is registered to the SCHEDULE display when the OK button is pressed on the SCHEDULE display and to the PROGRAM display when the OK button is pressed on the PROGRAM display.

● When the automatic operating mode is PROGRAM or SCHEDULE, the program cannot be registered unless the MEMORY button on the main control panel is pressed and illuminated.

CANCEL

Pressed to interrupt the registration and return to the PRE-EDIT display.

NOTE

● The screen returns to the SCHEDULE display when the CANCEL button is pressed on the SCHEDULE display and to the PROGRAM display when the CANCEL button is pressed on the PROGRAM display.

SAVING PROGRAM

A program created or edited on the screen can be saved in the NC unit as described below.

1   On the PRE-EDIT and SCHEDULE displays, select the program to be saved and press the SAVE button.   On the PROGRAM display, directly press the SAVE button.

PRE-EDIT display menu

SCHEDULE display menu

PROGRAM display menu

SAVE button
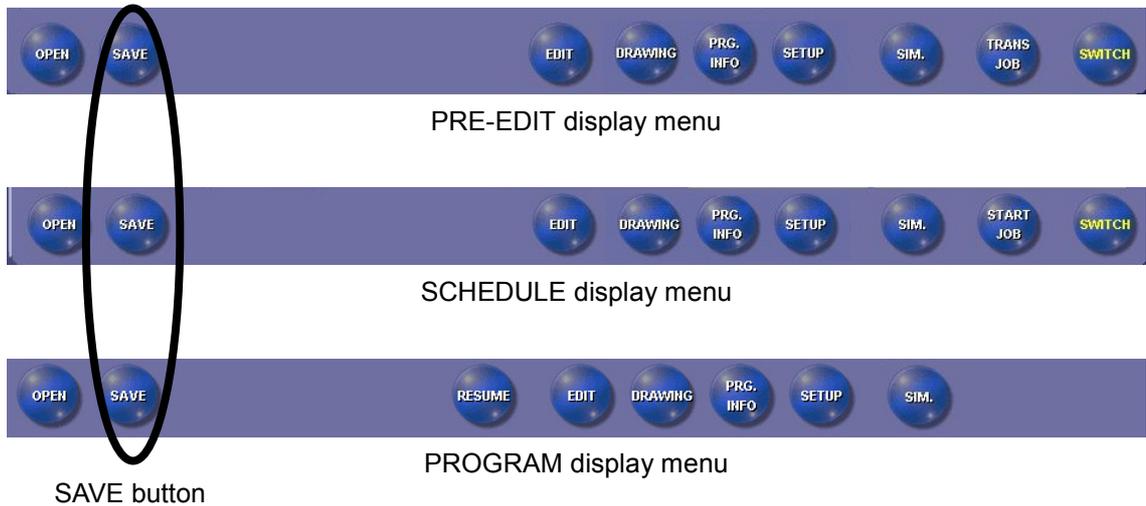
2   The Save data display appears, and the program to be saved is listed on the display.
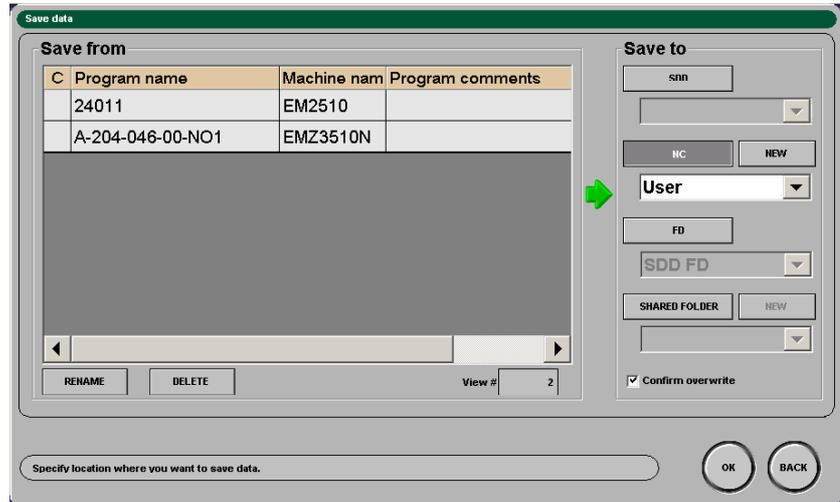
3   Select where to save the program, and press the OK button.
      The Confirm saved data display appears.

Confirm saved data				

Save to: **FD**   FD type **Data Transfer ID FD**

C		Program name	Machine name	Program comments
		KZ-627S	EM2510NT	
		YU1020-S	EM2510NT	

View # **2** items

☐ Exceeds the restriction.   ☐ Already exists.

RENAME   DELETE

Press the Execute button after confirming the data.

ABORT   EXECUTE   BACK

4   Check the name of the program, and press the EXECUTE button.

CREATING PROGRAM

The PRE-EDIT, SCHEDULE, and PROGRAM displays can be used to create a new program. Selecting "EDIT" from the menu of each display causes the EDIT display to appear on the screen.

PRE-EDIT display menu

SCHEDULE display menu

PROGRAM display menu

Using PRE-EDIT display

1   Even when a program or programs are listed on the PRE-EDIT display, press the EDIT button without selecting any program.

2   The Enter new program name display appears. Enter the name of the new program, and press the OK button.

3 The EDIT display appears.

4 Create the new program, and press the OK button to register it to the PRE-EDIT display.

> ──────── NOTE ────────
>
> ● For detailed information on the EDIT display, refer to "Editing program" in this Part.

Using SCHEDULE display

1　Even when a program or programs are listed on the SCHEDULE display, press the EDIT button without selecting any program.

2　The Enter new program name display appears.　Enter the name of the new program, and press the OK button.

3　The EDIT display appears.

4　Create the new program, and press the OK button to register it to the SCHEDULE display.

NOTE

● For detailed information on the EDIT display, refer to "Editing program" in this Part.

Using PROGRAM display

1 Press the EDIT button on the PROGRAM display.

The EDIT display appears for the program shown on the PROGRAM display.
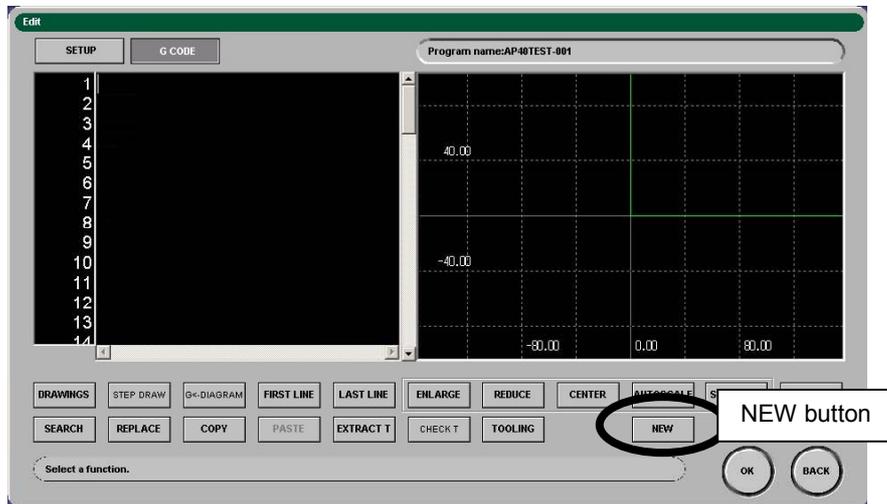
2 Press the NEW button.

The Enter new program name display appears.   Enter the name of the new program, and press the OK button.
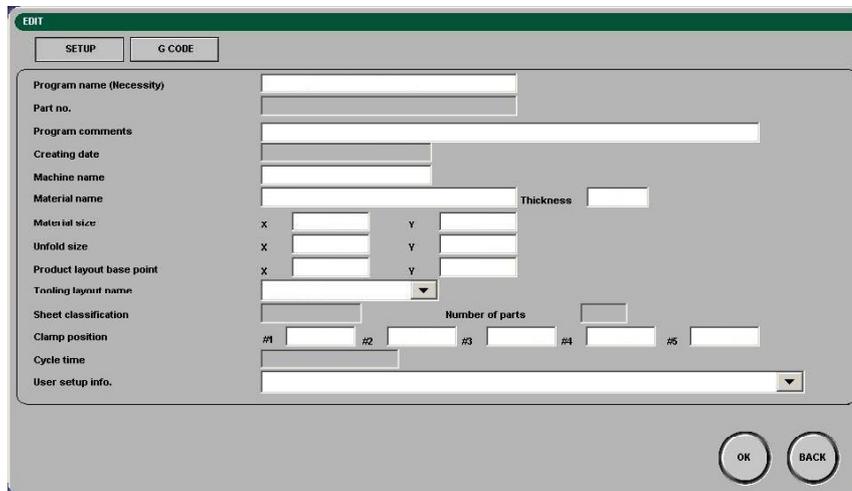
3 Create the new program, and press the OK button to register it to the PROGRAM display.

_____ NOTE _____

● For detailed information on the EDIT display, refer to "Editing program" in this Part.

Part V
Press Axis Control Parameters

DESCRIPTION

There are the following parameters to control the press axis.

Press pattern parameters

Up to 278 press patterns can be registered and can be selected to suit specific punching hits.   They are assigned M-codes.   Parameters of press patterns, such as the press stroke length and speed, can be set for specific M-codes.

To punch a worksheet with desired press patterns, combine corresponding M-codes into a program, and execute the program.

Tooling parameters

If the punch length, punch circumferential length, and shear angle are registered for each turret station, the worksheet can be punched at a speed to suit the set punch size, or some of the press pattern (press mode) commands can be omitted in the program.

The press position can also be compensated for reground punches.

Auto timer

The night and midnight time zones can be set to reduce the press speed and alleviate punching noise during the night and midnight.

Restore

Used by AMADA for maintenance purposes.

Menu of press control-related parameters

```
┌─────────────────────┐
│ Processing condition │
└─────────────────────┘
```

| STD INPUT | GUIDE INPUT | TOOLING DATA | AUTO TIMER | RESTORE |

TOOLING DATA:
- T201
- T202
- T303
- 〜
- T252

AUTO TIMER:
- NIGHT START TIME
- MIDNIGHT START TIME

NIBBLING	PUNCHING	KNOCKOUT	MARKING	SLITTING	FORMING
M12	M500	M502	M560	M506	M510
	M501	M503	M561	M507	M511
	M696	M504	M562	M508	M512
		M505	M563	M509	〜
		M570	M564		M559
		M571	M565		M800
		M572	M566		M801
		M573	M567		M802
		M574	M568		〜
		M575	M569		M999

NOTICE

● The tooling parameter Cut Line is set by default to the maximum circumferential length of the selected tooling type to suit each station. Particularly when the punch to be used in a large-diameter station is fixed, set the correct circumferential length of its cut edge for the machine to operate at the press speed that suits its size.

PRESS PATTERN PARAMETERS

Punching and nibbling patterns

Punching cuts a hole per stroke, while nibbling continuously cuts a shape in many strokes.

Standard punching and nibbling parameters are set in M500, M501 and M696, and M12, respectively. The press operates in these patterns as shown on pages V-4 and V-5.
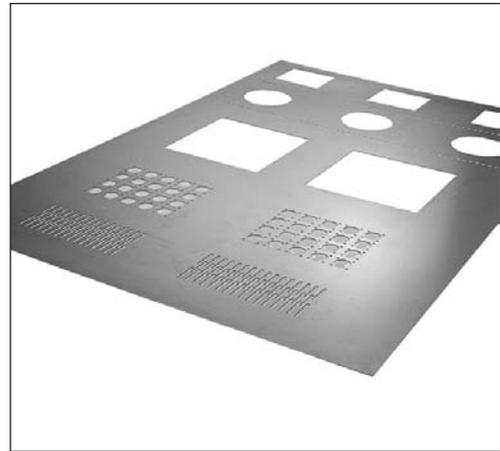
NOTE

● Usually, the press pattern parameters for M500, M501, M696, and M12 need not be changed.

M500:   Punching pattern (without shear angle)
          A punch with a flat tip is used.

M501:   Punching pattern (with shear angle)
          A punch with an angled tip is used.   The punch tip penetrates 2.5 mm deeper than is the case with M500.

M696:   Punching pattern (NEX punch)
          A NEX punch whose tip matches that of a guide is used.
          The press can continuously operate at high speed.
          This punching pattern cannot change the press speed.

M12:   Nibbling pattern
          There is no slow (deceleration) position, so that the press can continuously operate at high speed.

Punching and nibbling parameters

Parameter name	Description
Name	Name composed of 10 alphanumeric characters is assigned to each M-code.
Waiting position	Punch standby position for continuous processing with one tool. Set as distance from worksheet top surface.
Slow position	Punch rapidly moves down to worksheet and processes worksheet at lower speed. Set as distance from worksheet top surface.
Bottom position	Lower end of punch. Set as distance from die top surface.

Punching (M500, M501) parameter values
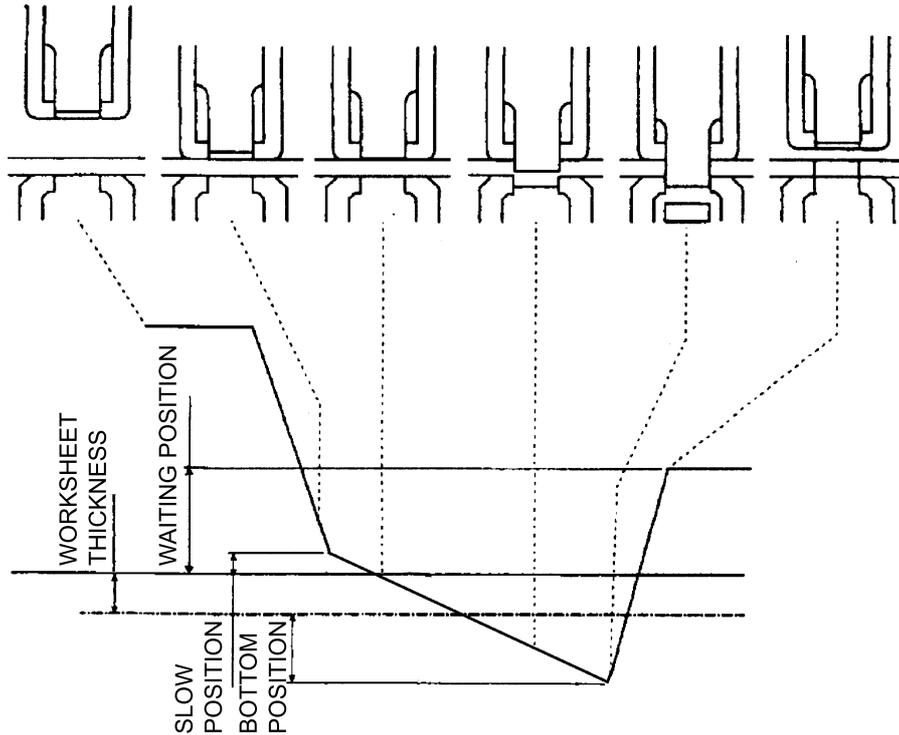
M-code	M500	M501		
Parameter name	Reference setting (recommended setting)		Unit	Setting range
Name	Name composed of 10 alphanumeric characters is assigned to each M-code.			
Waiting position	3		mm	3 to 99
Slow position	1		mm	0 to 99
Bottom position	2.5	5	mm	0 to 99

The worksheet thickness is set by the G06 command in the program.
(Refer to the programming manual.)

NOTE

● When the PRESS SPEED AUTO button on PANEL A is pressed and illuminated, the press speed is automatically set to suit the worksheet material and thickness and the tool size.

● With the M500 and M501 punching patterns, the difference between the tooling parameters Assy Length and Punch Length plus the set value of "Waiting position" is applied to the actual punch standby position.   When the tooling parameters Assy Length and Punch Length are set to 209.5 mm and 207.5 mm, respectively, for example, the punch standby position is corrected upward 2 mm from the set value of "Waiting position".

Punching (M696) and nibbling (M12) parameter values
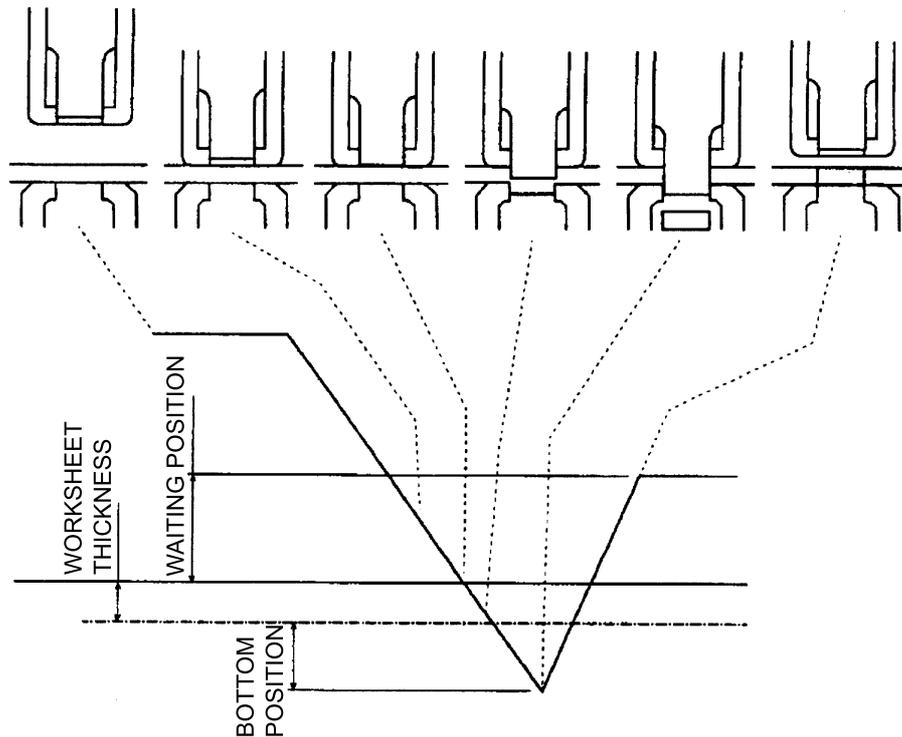
M-code	M696 and M12		
Parameter name	Reference setting (recommended setting)	Unit	Setting range
Name	Name composed of 10 alphanumeric characters is assigned to each M-code.		
Waiting position	3	mm	3 to 99
Bottom position	2.5	mm	0 to 99

The worksheet thickness is set by the G06 command in the program. (Refer to the programming manual.)

NOTE

● The nibbling pattern cannot change the press speed.

● With the nibbling pattern, the difference between the tooling parameters Assy Length and Punch Length plus the set value of "Waiting position" is applied to the actual punch standby position.   When the tooling parameters Assy Length and Punch Length are set to 209.5 mm and 207.5 mm, respectively, for example, the punch standby position is corrected upward 2 mm from the set value of "Waiting position".

● With the M696 punching pattern, the punch standby position is not corrected.

Knockout patterns

Knockout is a process in which a hole is punched with scrap attached to the worksheet.

The knockout parameters are as shown in the table below. The press operates according to the parameter settings as shown on the next page.

The NC unit can register 10 knockout patterns (M502 to M505 and M570 to M575).

Knockout parameters

Parameter name	Description	Default setting
Name	Name composed of 10 alphanumeric characters is assigned to each M-code.	
Waiting position	Punch standby position for continuous processing with one tool. Set as distance from worksheet top surface.	Worksheet thickness plus 5 to 8 mm This value must be so large that punch does not touch worksheet when it stops in standby position.
Slow position	Punch rapidly moves down to worksheet and processes worksheet at lower speed. Set as distance from worksheet top surface.	0 mm
Punch length	Overall punch length. Set as length from punch head to tip.	Measure and enter overall punch length.
Die length	Die length. Set as die length.	Measure and enter die length.
Die height	Value automatically calculated from punch length and die length. Usually need not be entered.	271 – punch length – die length (mm)
Bottom position	Lower end of punch. Set as distance from die top surface.	Set this value to 0 mm, and perform trial punching.* Gradually increase value while looking at knockout shape.

*For trial punching, refer to "Trial punching with press pattern" on page V-21.

Knockout parameter values
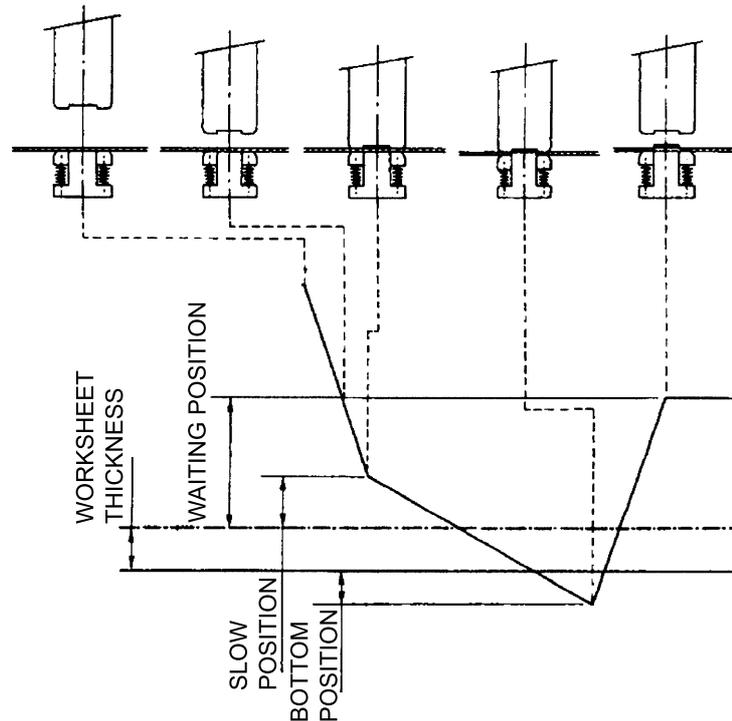
M-code	M502 to M505, M570 to M575		
Parameter name	Reference setting (recommended setting)	Unit	Setting range
Name	Name composed of 10 alphanumeric characters is assigned to each M-code.		
Waiting position	Worksheet thickness plus 5 to 8	mm	3 to 99
Slow position	0	mm	0 to 99
Punch length	Measured value	mm	0 to 267
Die length	Measured value	mm	0 to 99
Die height	Calculated value	mm	5 to 99
Bottom position	0.00 (trial punching)	mm	0 to 99

NOTE

● Set Punch length and Die length so that the value of "Die height" plus "Bottom position" becomes 36 mm or less.   The maximum press stroke length of the machine is 36 mm.   When a value that does not meet this condition is entered, an alarm is displayed.   One probable cause of the alarm is too small punch length.   Enter such a punch length that the press stroke length becomes 36 mm or less.
When there are multiple worksheet thicknesses, adjust the die height by adjusting the punch length so that parts can be formed from thinner worksheets.   When the punch length needs to be adjusted, it is recommended to enter a slightly larger punch length so that the bottom position can be finely adjusted.

Marking patterns

Marking is a process in which a tool is forced into the worksheet to leave a concave mark on the surface of the worksheet.

The marking parameters are as shown in the table below. The press operates according to the parameter settings as shown on the next page.

The NC unit can register 10 marking patterns (M560 to M569).

Marking parameters

Parameter name	Description	Default setting
Name	Name composed of 10 alphanumeric characters is assigned to each M-code.	
Waiting position	Punch standby position for continuous processing with one tool. Set as distance from worksheet top surface.	5 to 8 mm This value must be so large that punch does not touch worksheet when it stops in standby position.
Slow position	Punch rapidly moves down to worksheet and processes worksheet at lower speed. Set as distance from worksheet top surface.	0 mm
Punch length	Overall punch length. Set as length from punch head to tip.	Measure and enter overall punch length.
Die length	Die length. Set as die length.	Measure and enter die length.
Die height	Value automatically calculated from punch length and die length. Usually need not be entered.	271 – punch length – die length (mm)
Bottom position	Lower end of punch. Set as distance from worksheet top surface.	Set this value to 0 mm, and perform trial punching.* Gradually increase value while looking at marking condition.
High-speed marking	Select "1:High" for high-speed marking and "0:Normal" for no high-speed marking.	Usually 0 mm

* For trial punching, refer to "Trial punching with press pattern" on page V-21.

Marking parameter values
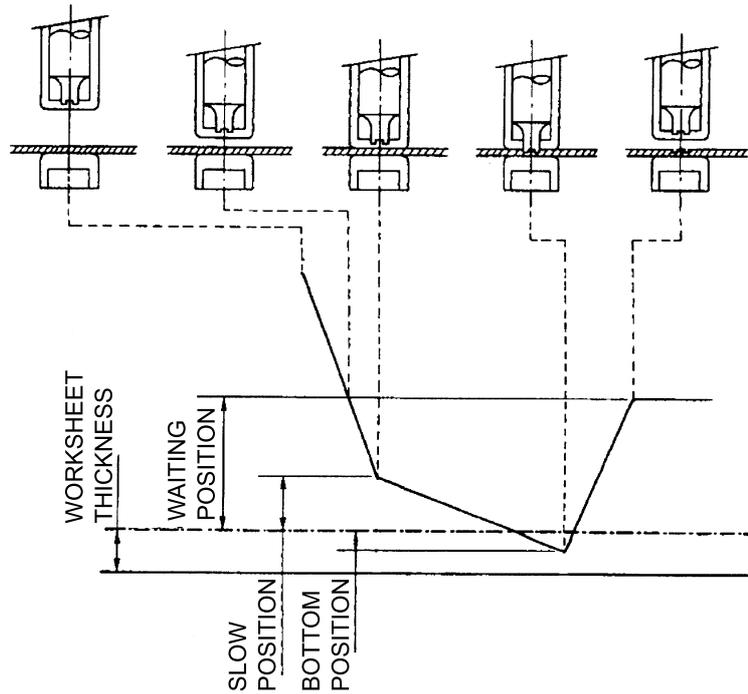
M-code	M560 to M569		
Parameter name	Reference setting (recommended setting)	Unit	Setting range
Name	Name composed of 10 alphanumeric characters is assigned to each M-code.		
Waiting position	5 to 8	mm	0.5 to 99
Slow position	0	mm	0 to 99
Punch length	Measured value	mm	0 to 267
Die length	Measured value	mm	0 to 99
Die height	Calculated value	mm	5 to 99
Bottom position	0.00 (trial punching)	mm	0 to 99
High-speed marking	Usually 0	—	1:High, 0:Normal

NOTE

● Set Punch length and Die length so that the value of "Die height" plus "Bottom position" minus "Worksheet thickness" becomes 36 mm or less.   The maximum press stroke length of the machine is 36 mm.   When a value that does not meet this condition is entered, an alarm is displayed.   One probable cause of the alarm is too small punch length.   Enter such a punch length that the press stroke length becomes 36 mm or less.
When there are multiple worksheet thicknesses, adjust the die height by adjusting the punch length so that parts can be formed from thinner worksheets.   When the punch length needs to be adjusted, it is recommended to enter a slightly larger punch length so that the bottom position can be finely adjusted.

Slitting patterns

Slitting is a process in which a narrow and long hole (slit) is cut from one end with a tool as shown in the figure below.   The cut edge is clean and seamless unlike in nibbling.

The slitting parameters are as shown in the table below.   The press operates according to the parameter settings as shown on the next page.

The NC unit can register four slitting patterns (M506 to M509).

Slitting parameters

Parameter name	Description	Default setting
Name	Name composed of 10 alphanumeric characters is assigned to each M-code.	
Waiting position	Punch standby position for continuous processing with one tool. Set as distance from worksheet top surface.	Refer to operator's manual of slitting tools.
Punch length	Overall punch length. Set as length from punch head to tip.	Measure and enter overall punch length.
Die length	Die length. Set as die length.	Measure and enter die length.
Die height	Value automatically calculated from punch length and die length. Usually need not be entered.	271 – punch length – die length (mm)
Bottom position	Lower end of punch when it does not drop scrap.	Refer to operator's manual of slitting tools.
Bottom position end	Lower end of punch when it drops scrap.	Refer to operator's manual of slitting tools.

Slitting parameter values

WORKSHEET THICKNESS
WAITING POSITION
BOTTOM POSITION
BOTTOM POSITION END
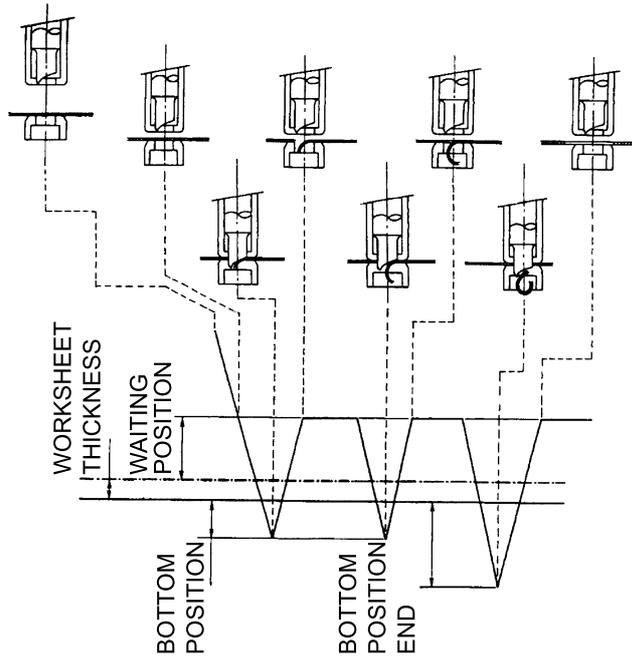
M-code	M506 to M509		
Parameter name	Reference setting (recommended setting)	Unit	Setting range
Name	Name composed of 10 alphanumeric characters is assigned to each M-code.		
Waiting position	Refer to operator's manual of slitting tools.	mm	3 to 99
Punch length	Measured value	mm	0 to 267
Die length	Measured value	mm	0 to 99
Die height	Calculated value	mm	5 to 99
Bottom position	Refer to operator's manual of slitting tools.	mm	0 to 99
Bottom position end	Refer to operator's manual of slitting tools.	mm	0 to 99

NOTE

● Set Punch length and Die length so that the value of "Die height" plus "Bottom position" becomes 36 mm or less.   The maximum press stroke length of the machine is 36 mm.   When a value that does not meet this condition is entered, an alarm is displayed.   One probable cause of the alarm is too small punch length.   Enter such a punch length that the press stroke length becomes 36 mm or less.
When there are multiple worksheet thicknesses, adjust the die height by adjusting the punch length so that parts can be formed from thinner worksheets.   When the punch length needs to be adjusted, it is recommended to enter a slightly larger punch length so that the bottom position can be finely adjusted.

Forming patterns

Forming is a process in which concave and convex designs are formed on the worksheet with dedicated tools.

The forming parameters are as shown in the table below. The press operates according to the parameter settings as shown on page V-14.

The NC unit can register 250 forming patterns (M510 to M559 and M800 to M999).

Forming parameters

Parameter name	Description	Default setting
Name	Name composed of 10 alphanumeric characters is assigned to each M-code.	
Waiting position	Punch standby position for continuous processing with one tool. Set as distance from worksheet top surface.	Forming height plus 5 to 8 mm This value must be so large that punch does not touch worksheet when it stops in standby position.
Slow position	Punch rapidly moves down to worksheet and processes worksheet at lower speed. Set as distance from worksheet top surface.	0 mm
Punch length	Overall punch length. Set as length from punch head to tip.	Measure and enter overall punch length.
Die length	Die length. Set as die length.	Measure and enter die length.
Die height	Value automatically calculated from punch length and die length. Usually need not be entered.	271 – punch length – die length (mm)
Cycle time	Time during which punch is held in bottom position	100 ms
Bottom position	Lower end of punch. Set as distance from worksheet top surface.	Set this value to 0 mm, and perform trial punching.* Gradually increase value while looking at formed designs.

Kinds	Two kinds are available: Normal and High Speed Forming. Use High Speed Forming for burring or other forming that has little influence on the accuracy at the lower end (e.g., burring).	Normal

*For trial punching, refer to "Trial punching with press pattern" on page V-21.

NOTE

● Do not set the Slow position parameter when High Speed Forming is selected. The NC unit regards the slow position as zero (0) even if another value is set in the Slow position parameter.

NOTICE

● Upward forming tools and downward forming tools differ in structure. Measure the punch length and die length by paying attention to this difference.

UPWARD FLANGING   DOWNWARD FLANGING

Punch length: A
Die length: B
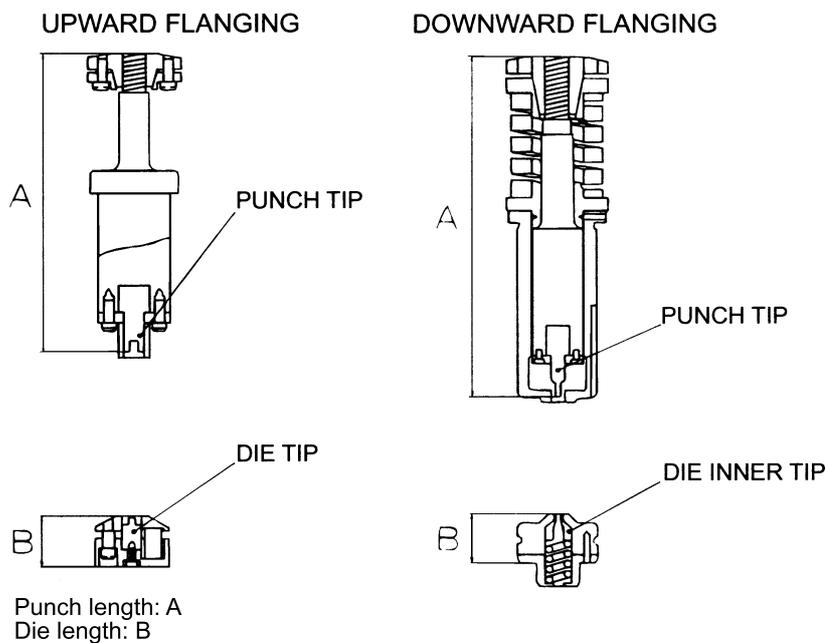
Forming (normal) parameter values
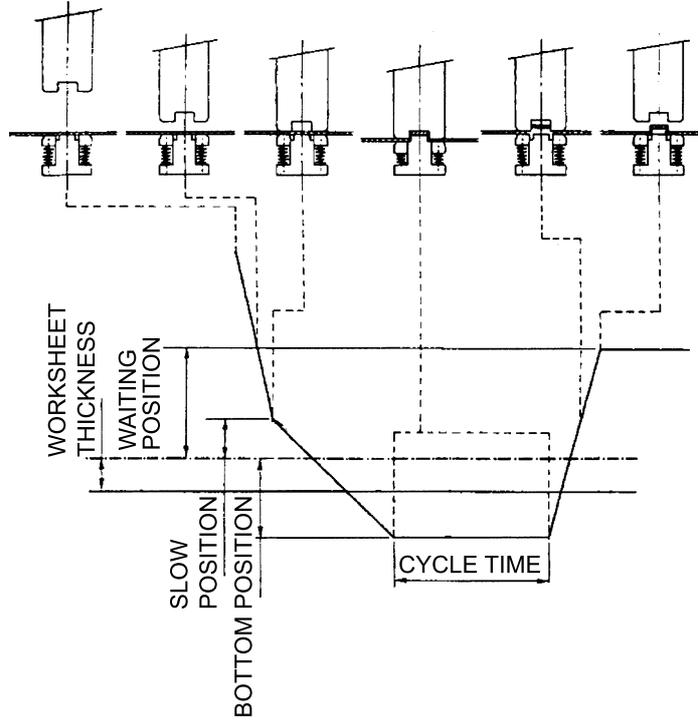
M-code	M510 to M559, M800 to M999		
Parameter name	Reference setting (recommended setting)	Unit	Setting range
Name	Name composed of 10 alphanumeric characters is assigned to each M-code.		
Waiting position	Forming height plus 5 to 8	mm	3.00 to 99.00
Slow position	0.00	mm	0.00 to 99.00
Punch length	Measured value	mm	0.00 to 267.00
Die height	Measured value	mm	0.00 to 99.00
Die top	Calculated value	mm	5.00 to 99.00
Cycle time	100	ms	0 to 999
Bottom position	0.00 (trial punching)	mm	0.00 to 99.00
Kind	Normal	-	

Forming (High Speed Forming) parameter values
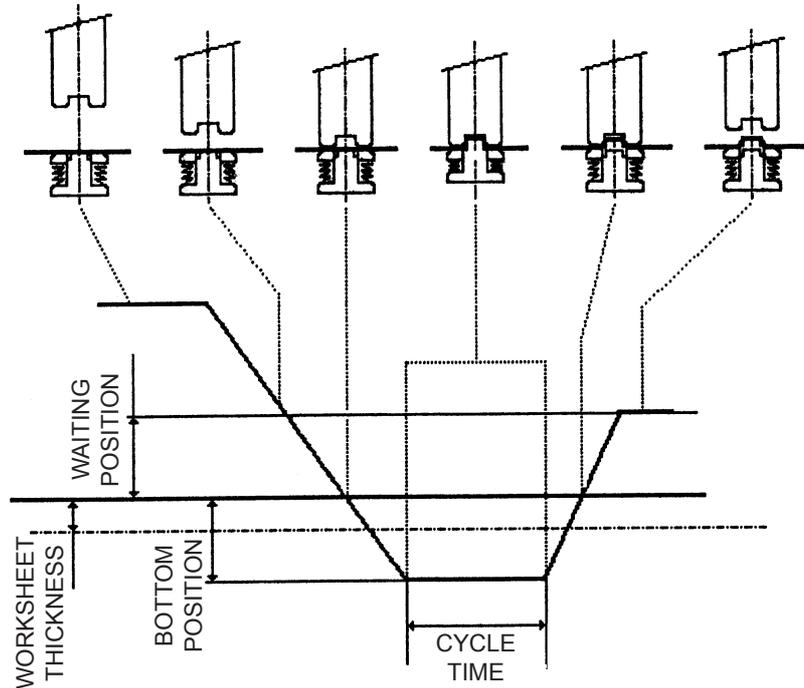
M-code	M510 to M559, M800 to M999		
Parameter name	Reference setting (recommended setting)	Unit	Setting range
Name	Name composed of 10 alphanumeric characters is assigned to each M-code.		
Waiting position	Forming height plus 5 to 8	mm	3.00 to 99.00
Punch length	Measured value	mm	0.00 to 267.00
Die height	Measured value	mm	0.00 to 99.00
Die top	Calculated value	mm	5.00 to 99.00
Cycle time	100	ms	0 to 999
Bottom position	0.00 (trial punching)	mm	0.00 to 99.00
Kind	High speed forming	-	

NOTE

● When High Speed Forming is selected, the NC unit regards the slow position as zero (0) even if another value is set in the Slow Position parameter.

Parameter value setting ranges

Press pattern	Nibbling	Punching			Knockout	Marking	Slitting	Forming
M-code	M12	M500	M501	M696	M502 to M505 M570 to M575	M560 to M569	M506 to M509	M510 to M559 M800 to M999
Waiting position (mm)	[3.00] 3.00 to 99.00	[3.00] 3.00 to 99.00	[3.00] 3.00 to 99.00	[3.00] 3.00 to 99.00	3.00 to 99.00	0.50 to 99.00	3.00 to 99.00	3.00 to 99.00
Slow position (mm)	–	[1.00] 0.00 to 99.00	[1.00] 0.00 to 99.00	–	0.00 to 99.00	0.00 to 99.00	–	0.00 to 99.00 (Not available for high speed forming)
Punch length (mm)	–	–	–	–	0.00 to 267.00	0.00 to 267.00	0.00 to 267.00	0.00 to 267.00
Die length (mm)	–	–	–	–	0.00 to 99.00	0.00 to 99.00	0.00 to 99.00	0.00 to 99.00
Die height (mm)	–	–	–	–	5.00 to 99.00	5.00 to 99.00	5.00 to 99.00	5.00 to 99.00
Cycle time (ms)	–	–	–	–	–	–	–	0 to 999
Bottom position (mm)	[2.50] 0.00 to 99.00	[2.50] 0.00 to 99.00	[5.00] 0.00 to 99.00	[2.50] 0.00 to 99.00	0.00 to 99.00	0.00 to 99.00	0.00 to 99.00	0.00 to 99.00
Bottom position end (mm)	–	–	–	–	–	–	0.00 to 99.00	–
High-speed marking	–	–	–	–	–	1: High 0: Normal	–	–
Kind	–	–	–	–	–	–	–	Normal/ High Speed Forming

NOTE

● The parameter values are given in the ranges where they can be registered in the NC unit.   Determine the actual parameter values by considering the "reference setting" values in the parameter value table of each press pattern and the specifications of the tooling and machine.

● The punching and nibbling patterns have the parameter values enclosed in brackets and set as the default values (recommended values).

● Do not set the Slow position parameter when High Speed Forming is selected. The NC unit regards the slow position as zero (0) even if another value is set in the Slow Position parameter.

Setting press pattern parameters

Press the STD INPUT button on the processing condition display to open the STD INPUT display shown below.

The parameter values for each press pattern (M-code) can be set by one of two methods. The first method involves displaying an M-code list and setting the parameter values on the list. The second method consists of opening a press pattern guide input display and setting the parameter values on the display.

SETTING PARAMETERS ON M-CODE LIST (STD INPUT DISPLAY)

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	NIBBLING	PUNCHING	KNOCKOUT	MARKING	SLITTING	FORMING

M-code	Name	Waiting Position	Slow Position	Punch Length	Die Length	Die Height	Bottom Position	Cycle Time
M510		5.00	4.00			37.00	0.50	300
M511		3.00	0.00			20.00	0.00	0
M512		0.00	0.00			0.00	0.00	0
M513		0.00	0.00			0.00	0.00	0
M514		0.00	0.00			0.00	0.00	0
M515		3.00	1.00			30.00	1.00	1
M516		0.00	0.00			0.00	0.00	0
M517		1.00	1.00			30.00	1.00	1

DEFAULT   CALCULATE DIE HEIGHT   TRIAL PUNCH   Type the M-code you want to find and press the ENTER key.   510   REGISTER

STD INPUT   GUIDE INPUT   TOOLING DATA   AUTO TIMER   RESTORE

Description of display

Press pattern selection buttons

Select NIBBLING, PUNCHING, KNOCKOUT, MARKING, SLITTING, or FORMING to display an M-code list for each press pattern.

Search field

Used to search for an M-code. Enter an M-code number, and press the ↵ key. A list containing the specified M-code number appears.

DEFAULT button

Pressed to return the parameter values of the selected M-code to the default values.

CALCULATE DIE HEIGHT button

Pressed to automatically calculate the die height parameter value from the punch length and die length parameter values.

TRIAL PUNCH button

Pressed to open the Trial Punch display for trial punching each press pattern.

GUIDE INPUT button

Pressed to open the GUIDE INPUT display for the selected press pattern (press mode) M-code.   You can enter the parameter values for the press pattern while checking them.

TOOLING DATA button

Refer to "Tooling parameters" later in this Part.

AUTO TIMER button

Refer to "Auto timer" later in this Part.

RESTORE button

Used by AMADA for maintenance purposes.

Setting forming parameters

As an entry example, the procedure for setting the forming parameters is described below.   Follow the same procedure for setting other press pattern parameters.

1   Press the STD INPUT button on the processing condition display.

The STD INPUT display appears.

2   Turn the EDIT PROTECT keyswitch on the main control panel to OFF.

3   Press the FORMING button.

The forming pattern M-code list appears.

M-code	Name	Waiting Position	Slow Position	Punch Length	Die Length	Die Height	Bottom Position	Cycle Time	
M510		5.00	4.00			37.00	0.50	300	
M511		3.00	0.00			20.00	0.00	0	
M512		0.00	0.00			0.00	0.00	0	
M513		0.00	0.00			0.00	0.00	0	
M514		0.00	0.00			0.00	0.00	0	
M515		3.00	1.00			30.00	1.00	1	
M516		0.00	0.00			0.00	0.00	0	
M517		1.00	1.00			30.00	1.00	1	

Tabs: NIBBLING, PUNCHING, KNOCKOUT, MARKING, SLITTING, FORMING

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Buttons: DEFAULT, CALCULATE DIE HEIGHT, TRIAL PUNCH

Type the M-code you want to find and press the ENTER key.   510   REGISTER

STD INPUT, GUIDE INPUT, TOOLING DATA, AUTO TIMER, RESTORE

4   Press the M-code line at which you want to set the parameters.

The parameters on the specified M-code line can be changed.

If the M-code to set is not shown on the display, scroll the M-code list by using the scroll bar or search field.

5   Press the parameter field to set, enter the necessary parameter value with the accessory keyboard, and press the ↵ key.

NOTE

● Enter the parameter value by referring to the reference setting (recommended setting) of each parameter.

6   Similarly enter the parameter values in the other parameter fields.

7   Repeat the above procedure from step 4 to set the parameters for other M-codes.

8   Press the REGISTER button to register the new parameters in the NC unit.

SETTING PARAMETERS ON GUIDE INPUT DISPLAY

As an entry example, the procedure for setting the forming parameters is described below.   Follow the same procedure for setting other press pattern parameters.

Setting forming parameters

Set the forming parameters as described below.

1   Press the STD INPUT button on the processing condition display.

The STD INPUT display appears.

2   Turn the EDIT PROTECT keyswitch on the main control panel to OFF.

3   Press the FORMING button.

The forming pattern M-code list appears.

M-code	Name	Waiting Position	Slow Position	Punch Length	Die Length	Die Height	Bottom Position	Cycle Time
M510		5.00	4.00			37.00	0.50	300
M511		3.00	0.00			20.00	0.00	0
M512		0.00	0.00			0.00	0.00	0
M513		0.00	0.00			0.00	0.00	0
M514		0.00	0.00			0.00	0.00	0
M515		3.00	1.00			30.00	1.00	1
M516		0.00	0.00			0.00	0.00	0
M517		1.00	1.00			30.00	1.00	1

NIBBLING PUNCHING KNOCKOUT MARKING SLITTING FORMING

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DEFAULT   CALCULATE DIE HEIGHT   TRIAL PUNCH

Type the M-code you want to find and press the ENTER key.   510   REGISTER

STD INPUT   GUIDE INPUT   TOOLING DATA   AUTO TIMER   RESTORE

4   Press the M-code line at which you want to set the parameters.
(In this example, press the line M510.)

The parameters on the specified M-code line can be changed.

If M510 is not shown on the display, scroll the M-code list by using the scroll bar or search field.

5   Press the GUIDE INPUT button.

The GUIDE INPUT display for M510 appears.
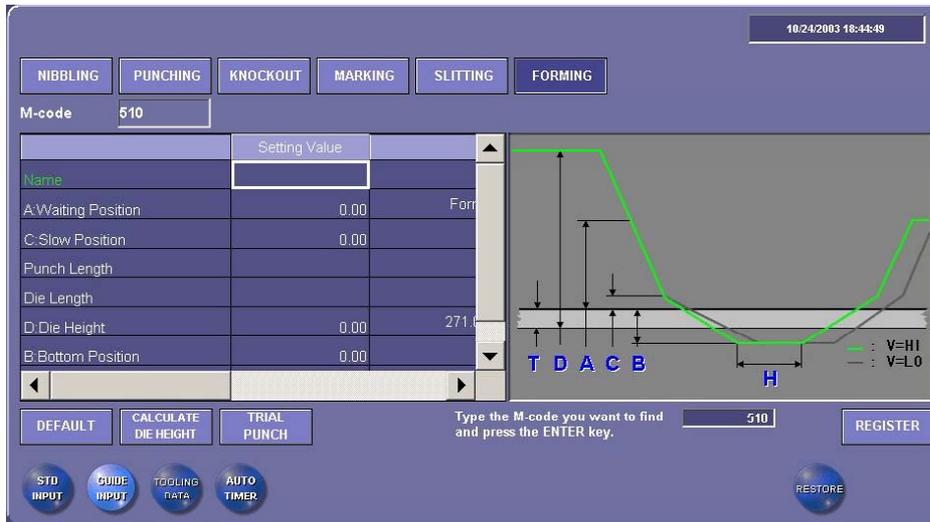
6   Press the parameter field to set, enter the necessary parameter value with the accessory keyboard, and press the ↵ key.

NOTE

● Enter the parameter value by referring to the reference setting (recommended setting) of each parameter.

7   Similarly enter the parameter values in the other parameter fields.

8   Repeat the above procedure from step 4 to set the parameters for other M-codes.

9   Press the REGISTER button to register the new parameters in the NC unit.

Trial punching with press pattern

TRIAL PUNCHING ON TRIAL PUNCH DISPLAY

Trial punch a press pattern on the Trial Punch display as described below.

NOTE

● Slitting cannot be tried on the Trial Punch display.   Try slitting with the program as described on the next page.

1 Set the worksheet on the table.

2 Press and illuminate the MEMORY button on the main control panel.

3 Turn the EDIT PROTECT keyswitch on the main control panel to OFF.

4 Select the axis feed speed and press speed.

5 Set the press pattern parameters for the related M-code on the STD INPUT or GUIDE INPUT display.

NOTICE

● When trying forming, marking, or knockout, set the bottom position parameter value to 0.   Repeat trial punching several times, and gradually increase the bottom position parameter value until an optimum value is obtained.

6 Press the TRIAL PUNCH button on the STD INPUT or GUIDE INPUT display.

The Trial Punch display appears.

Trial Punch			
Thickness	0.000	Pilot hole T	0
Material quality	Iron	M-code	510
Position X	0.000	Creation T	0
Position Y	0.000	P and F 0: No /1: Yes	No

ABSOLUTE			
X: 2500.00	T: 220	AL: 0.00	CLOSE
Y: 1525.00	C: 0.00		

NOTE

● Press the CLOSE button to exit the Trial Punch display and return to the STD INPUT or GUIDE INPUT display.

7   Set the following data on the Trial Punch display to trial punch with the selected tool:

Thickness: Enter the thickness of the worksheet.

Material quality: Select the material of the worksheet (steel, stainless steel, or aluminum).

Position X: Enter the X-coordinate of the trial punch position.

Position Y: Enter the Y-coordinate of the trial punch position.

Pilot hole T: Select whether or not to pre-punch a hole.   (If you have selected No, enter 0, and if you have selected Yes, enter the T-number for the pre-punching tool.)

M-code: Enter the M-code number for the trial punch press pattern.

Creation T: Enter the T-number for the trial punching tool.

P and F: Select whether or not to perform P&F.   (Set to No.)

8   Press the START button on the main control panel.

The worksheet is positioned and punched with the tool with the specified T-number and the press pattern of the specified M-code. After completing the trial punching operation, the machine zero-returns.

TRIAL PUNCHING ACCORDING TO PROGRAM

Try punching according to a program as described below.

1   Create one of the following trial punching programs:

[for forming, marking, or knockout]

G06 A thickness B material;	… Worksheet data
G92 X__ Y__;	… Origin setting
M__;	… Press pattern (press mode)
G90 X__ Y__ T__;	… Positioning and punching
M13;	… Press pattern (press mode) cancel
G50;	… Zero-return

[for slitting]

G06 A thickness B material;	… Worksheet data
G92 X__ Y__;	… Origin setting
M690;	… Air blow
M__;	… Press pattern (press mode)
G90 X__ Y__ T__;	… Positioning and punching
G28 I__ J__ K__;	… Line at angle
M13;	… Press pattern (press mode) cancel
G28 I__ J__ K__;	… Line at angle
G50;	… Zero-return

NOTE

● Enter 0.1 to 6.3 mm (worksheet thickness) in A of G06, and enter either 0 for SPC (mild steel), 1 for SUS (stainless steel) or 2 for AL (aluminum) in B of G06.

● For the methods of creating a program on the screen and calling it to the screen, refer to Part IV, Program management.

2   Check that the tool that meets the selected press pattern is installed in the turret station commanded by "T__".

3   Set the worksheet on the machine.

4   Press and illuminate the MEMORY button on the main control panel.

5   Select the axis feed speed and press speed.

6   Press the START button on the main control panel.

7   Repeat trial punching while looking at the punching result and gradually increasing the bottom position parameter value. Increase the bottom position parameter value in 0.1-mm increments for marking and in increments of about 0.5 mm for slitting.

8   Check the waiting position of the punch, and adjust its parameter value so that the punch does not touch the worksheet after trial punching.

TOOLING PARAMETERS

If the tooling parameters Punch Length, Assy Length, Cut Line, and Shear are set for each turret station, the worksheet can be punched at a speed that suits the set punch size, or some of the press pattern (press mode) commands can be omitted in the program.   The press position can also be compensated for reground punches.

T#

Turret station numbers are registered.

Range

Tool types are registered.

A: 1/2", B: 1-1/4", C: 2", D: 3-1/2", E: 4-1/2"

Punch Length

Punch length from the head to the tip.   The default setting is the length of a new punch for each size.   Reset this parameter value when the punch length changes due to regrinding, for example.

Assy Length

Length from the punch head to the holddown.   The default setting is the length of a new punch assembly for each size.   Reset this parameter value when the assembly length changes due to regrinding, for example.

Cut Line

Circumferential length of a punch.   The default setting is the maximum circumferential length of the selected tooling type to suit each station. Enter the circumferential length of the punch to be actually used.

Shear

Sets whether or not the punch tip has a shear angle.   Select from between ON and OFF.   The default setting is OFF for all stations except the 4-1/2" stations.

NOTE

● When the press pattern command consists of M500, M501, and M12, the difference between the tooling parameter Assy Length and Punch Length is added to the set value of "Waiting position" for each press pattern.   When the tooling parameters Assy Length and Punch Length are set to 209.5 mm and 207.5 mm, respectively, for example, the punch standby position is corrected upward 2 mm from the set value of "Waiting position".

Default values of tooling parameters

Unit: mm

Tool type	Punch length	Assy length (Standard punches)	Assy length (NEX punches)	Cut Line
Type A (1/2")	207.5	209.5 (punch length plus 2)	208.0(punch length plus 0.5)	39.9
Type B (1-1/4")	207.5	209.5 (punch length plus 2)	208.0(punch length plus 0.5)	83.0
Type C (2")	208.0	209.0 (punch length plus 1)	209.0 (punch length plus 1)	133.0
Type D (3-1/2")	209.0	211.0 (punch length plus 2)	210.0 (punch length plus 1)	217.0
Type E (4-1/2")	210.0	211.0 (punch length plus 1)	211.0 (punch length plus 1)	217.0

Setting tooling parameters

Set the tooling parameters as described below.

1 Press the TOOLING DATA button on the processing condition display.
The TOOLING DATA display appears.
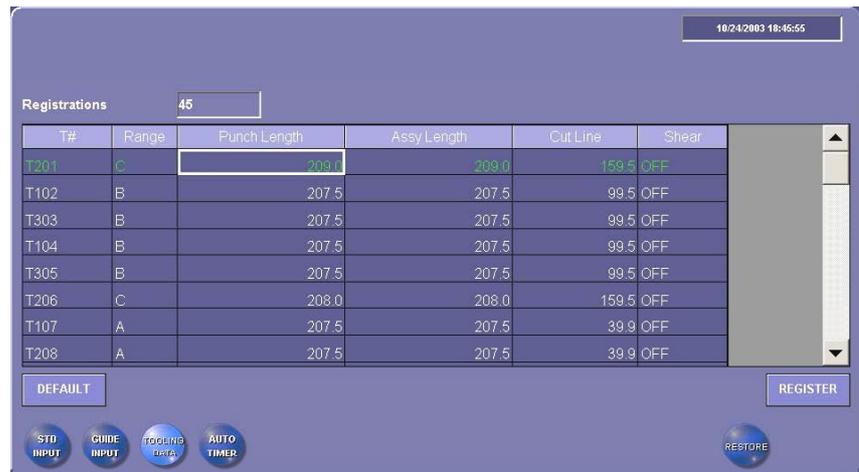
2 Turn the EDIT PROTECT keyswitch on the main control panel to OFF.

3 Press the T-number line at which you want to set the parameters.
The parameters on the specified T-number line can be changed.

4 Press the parameter field to set.
Enter the necessary parameter value with the accessory keyboard, and press the ↵ key.
For the shear angle, the ON/OFF selection display appears.
Select from between ON and OFF.

5 Similarly set the parameter values in the other parameter fields.

6 Repeat the above procedure from step 3 to set the parameters for other T-numbers.

7 Press the REGISTER button to register the new parameters in the NC unit.

AUTO TIMER

When the PRESS SPEED AUTO button on PANEL A is pressed and illuminated and the Auto Timer switch on the AUTO TIMER display is set to ON, the press speed can be automatically reduced to alleviate punching noise in the night and midnight time zones.

To automatically reduce the press speed to prevent night punching noise, set the night and midnight time zones to suit the prevailing situation.

The night and midnight time zones are defaulted at the time of factory shipment as follows:

Night time zone: 19:00 to 23:00

Midnight time zone: 23:00 to 8:00
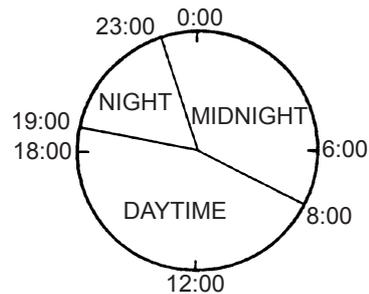
Setting auto timer

Set the auto timer as described below.

1   Press and illuminate the PRESS SPEED AUTO button on PANEL A.

2   Press the AUTO TIMER button on the processing condition display.

The AUTO TIMER display appears.

3   Turn the EDIT PROTECT keyswitch on the main control panel to OFF.

4   Set the time zone or zones to change with the ▼ buttons.

5   Set the Auto Timer switch to ON to make the time zone settings effective.

6   Press the REGISTER button.

Part VI

Operation

(Continued on next page.)

PREPARING AND CHECKING BEFORE TURNING ON POWER

⚠️ WARNING	● Be sure to check the machine before the start of the day's work. As soon as you find equipment failure or trouble, repair it or take any other necessary measure to prevent an accident.

Before turning on the power of the machine, turn on the power of the air compressor.

Before starting the machine every day, check that:

- The main air pressure is 0.5 MPa (5.0 kgf/cm^2).   If it is not, adjust it to 0.5 MPa (5.0 kgf/cm^2) as described in "Daily maintenance" in Part VIII, Maintenance.

- The air filter is drained of water.

- The lubricator is properly filled with oil.

- There are no workers and obstacles around the machine.

TURNING ON POWER

Turn on the power of the machine as described below.

1   Turn on the shop circuit breaker switch.

2   Turn the machine circuit breaker switch on the electrical control cabinet to ON.

The cooling fans in the electrical control cabinet start running.

3   Press the POWER ON button on the main control panel.

The light of the button comes on to indicate that the power of the NC unit is turned on.

After about 2 min, the initial display appears on the screen.

MACHINE CIRCUIT BREAKER SWITCH

4 Check that the NC READY and TOP DEAD CENTER lights on the main control panel are turned on.

Check also that the MACHINE STOP light on the main control panel is turned off.

POWER ON button

NC READY light
TOP DEAD CENTER light
MACHINE STOP light
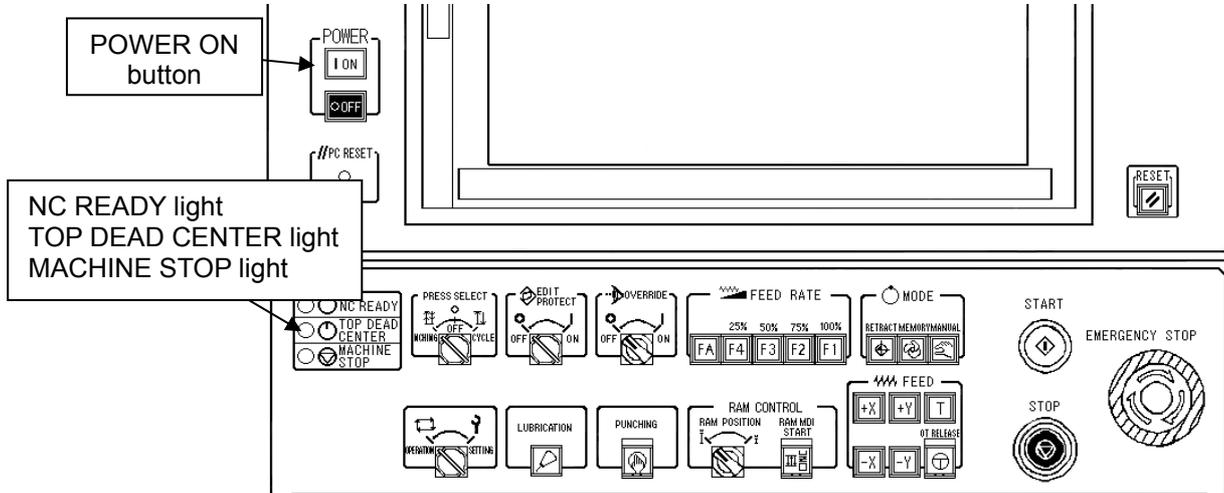
NOTE

● When the ambient temperature is less than 5°C {41°F}, the AMNC may not operate properly.

ZERO-RETURNING

Zero-return the machine as described below.

1   Check that the NC READY and TOP DEAD CENTER lights on the main control panel are turned on.

2   Turn the SAFETY DEVICE keyswitch on the main control panel to OPERATION.
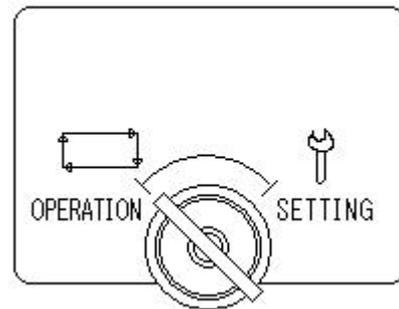
3   Check that the RETRACT button on the main control panel is illuminated.   If it is not illuminated, press the RETRACT button to turn it on.
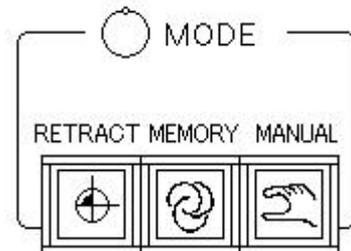
4   Check that the workclamps are closed.   If they are not closed, press the foot switch to close them.

5   Press the +X, +Y, and T buttons on the main control panel sequentially to start the X-, Y-, T-, and C-axes zero-returning.

The lights of the +X, +Y, and T buttons come on to indicate that the zero-return of the X-, Y-, T-, and C-axes is completed.
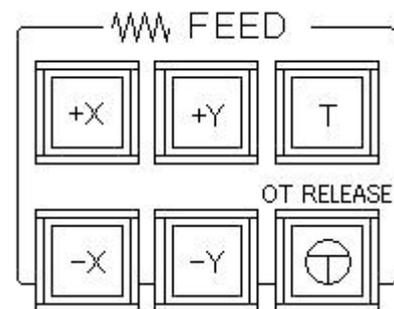
NOTE

● Press the T button to zero-return the T- and C-axes.

This procedure makes the machine ready for its automatic operation.

READING PROGRAM OR PROGRAMS

Here is described the procedure for reading a program or programs from a floppy disk.   When using another input or output device or creating a new program, refer to Part IV, Program management.

Single-program operation

When performing the single-program operation of the machine, read the necessary program to the PROGRAM display as described below.

1   Press and illuminate the MEMORY button on the main control panel.

2   Insert into the floppy disk drive the floppy disk containing the program to be used, with the label side up.
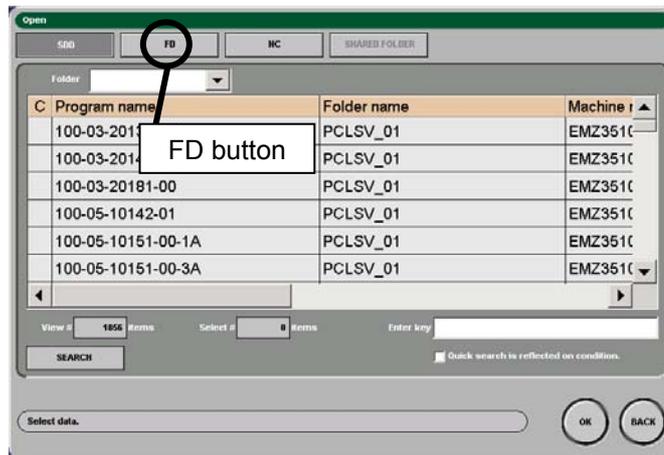
3   Press the OPEN button on the PROGRAM display.

OPEN button

FD button

4   Press the media selection FD button on the Open display.

The programs contained in the floppy disk are listed on the Open display.

5   Select the program on the Open display.

Move the cursor to the name of the program, or directly touch the name of the program.

NOTE

● Multiple programs cannot be selected at a time.

6   Press the OK button on the Open display.

The selected program is read to the PROGRAM display, and its contents are shown on the PROGRAM display.

USING BAR CODE READER

Here is described the procedure for reading a program or programs by using a bar code reader.

Read the program or programs to the PROGRAM display as described below.

1 Press and illuminate the MEMORY button on the main control panel.

2 Press the Open button on the PROGRAM display.

SDD button

Open button
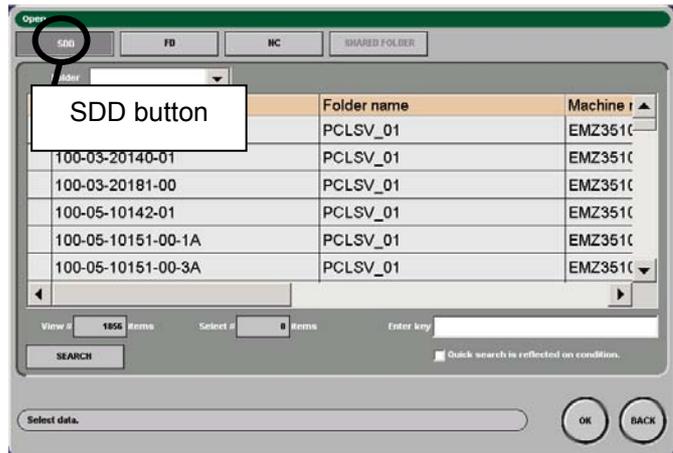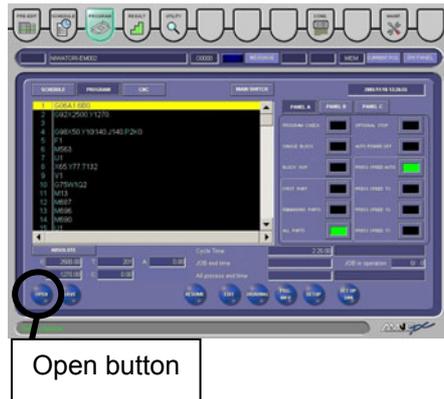
3 Press the media selection SDD button on the Open display.

The programs stored in the SDD system are listed on the Open display.

4 Scan with a bar code reader the program number bar code on the work instruction sheet.

5 If the program of the number read with the bar code reader is listed, it is selected.
If it is not listed, its name is shown in the guide area.
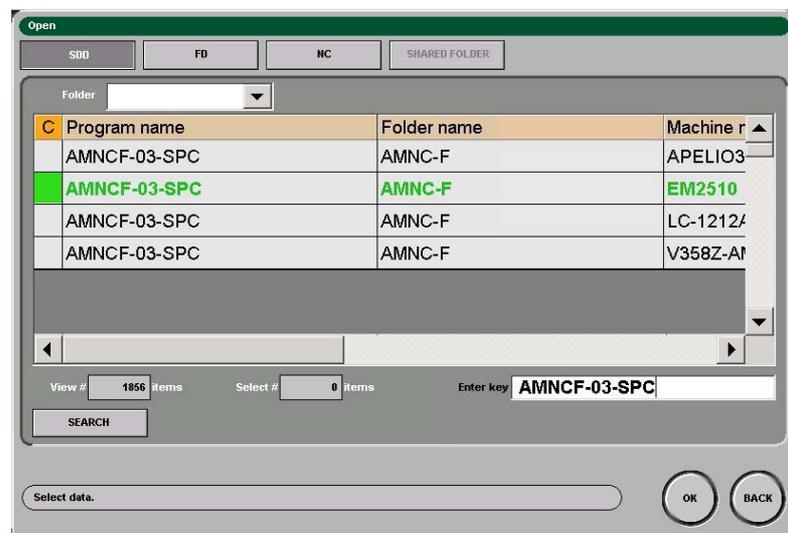
6   Press the OK button on the Open display.

     The selected program is read to the PROGRAM display, and its contents are shown on the PROGRAM display.

NOTE

● If the selected program has two or more machine names, select the Machine name field.

Schedule operation

When performing the schedule operation of the machine, read the necessary program or programs to the SCHEDULE display as described below.

1   Press and illuminate the MEMORY button on the main control panel.

2   Insert into the floppy disk drive the floppy disk containing the program or programs to be used, with the label side up.
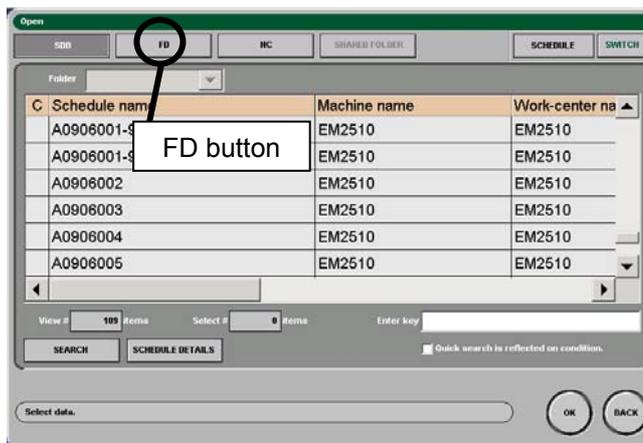
3   Press the OPEN button on the SCHEDULE display.

OPEN button

FD button

4   Press the media selection FD button on the Open display.

     The programs contained in the floppy disk are listed on the Open display.

5 Select the first program to execute in the schedule on the Open display.

Move the cursor to the name of the program, or directly touch the name of the program.

6 Press the OK button on the Open display.

The selected program is read to the SCHEDULE display.

7 Repeat steps 5 and 6 above to read the second and subsequent programs to execute to the SCHEDULE display.

NOTE

● Multiple programs can be read from the floppy disk.

● To read schedule file in the ASIS 100PCL to the SCHEDULE display, press the SWITCH button on the Open display to show the schedule name.

READING SCHEDULE FILE

Here is described the procedure for reading a schedule file from a floppy disk.

For using another I/O device or creating a new program, refer to Part IV, Program Management.

Schedule file operation

To operate the machine according to a schedule file, read the schedule file to the SCHEDULE display as described below.

1 Press and illuminate the MEMORY button on the main control panel.

2 Insert into the floppy disk drive the floppy disk containing the schedule file to be used, with the label side up.

3 Press the OPEN button on the SCHEDULE display.

FD button

SWITCH button

OPEN button
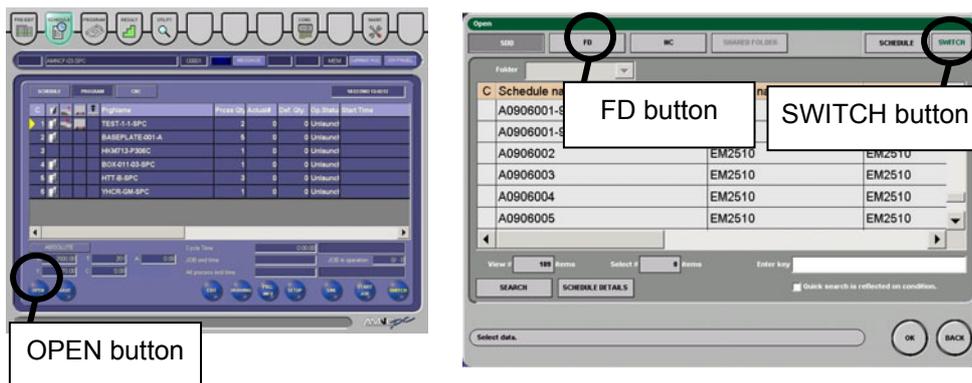
4 Press the media selection FD button on the Open display.

5 Press the SWITCH button to indicate the Schedule file name.

6 Select the schedule file to execute on the Open display.

Move the cursor to the name of the schedule file, or directly touch the name of the schedule file.
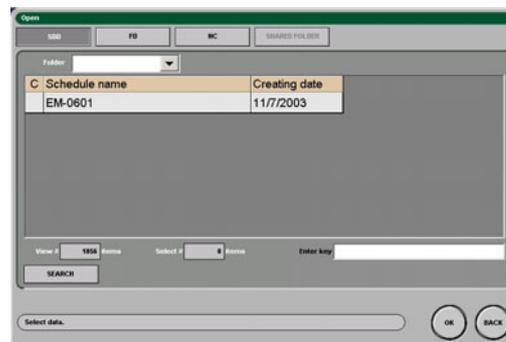
7 Press the OK button on the Call display.

The selected schedule file is read to the SCHEDULE display.

CHECKING SHAPE OF PART

The part processed by the program read to the PROGRAM or
SCHEDULE display can be drawn to check its shape.

Checking on PROGRAM display

DRAW button
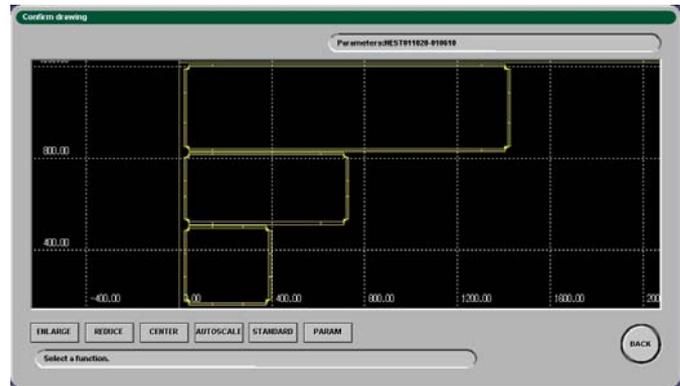
1   Press the DRAW button.

    The Confirm drawing display appears and shows the shape of the
    part.

2   After checking the shape of the part, press the BACK button to
    return to the PROGRAM display.

Checking on SCHEDULE display

DRAW button
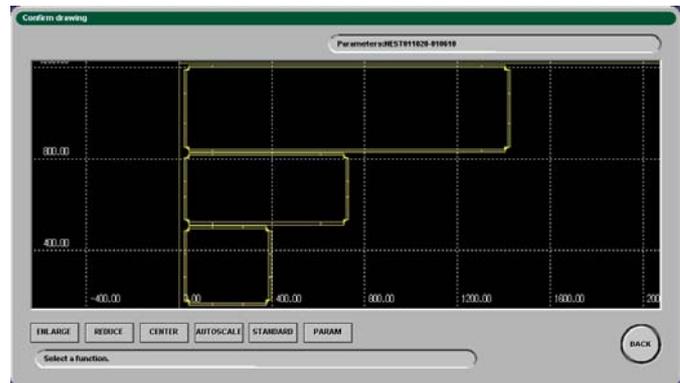
1   Select the program to be used for checking the shape of the part,
    and press the DRAW button.

    The Confirm drawing display appears and shows the shape of the
    part.

2   After checking the shape of the part, press the BACK button to
    return to the SCHEDULE display.

CHECKING SETUP OF TOOLS AND WORKSHEETS

Checking on PROGRAM display

Press the SIM button.

When there is a setup to be made with the program shown on the PROGRAM display, the display for the setup automatically appears. When there is no setup to be made, such a display does not automatically appears.

TOOL SETUP

Determine tool setups according to setup instructions.

NOTE

● For further information on the setup display, refer to Part III, Displays.

MATERIAL/CLAMP SETUP

Make worksheet and workclamp setup calculations according to setup instructions.

NOTE

● For further information on the setup display, refer to Part III, Displays.

Checking on SCHEDULE display

Press the SIM button.

A setup mark appears when a setup is made with a program listed on the SCHEDULE display.

Setup marks

Select a part given the setup mark to show the setup display.

TOOL SETUP
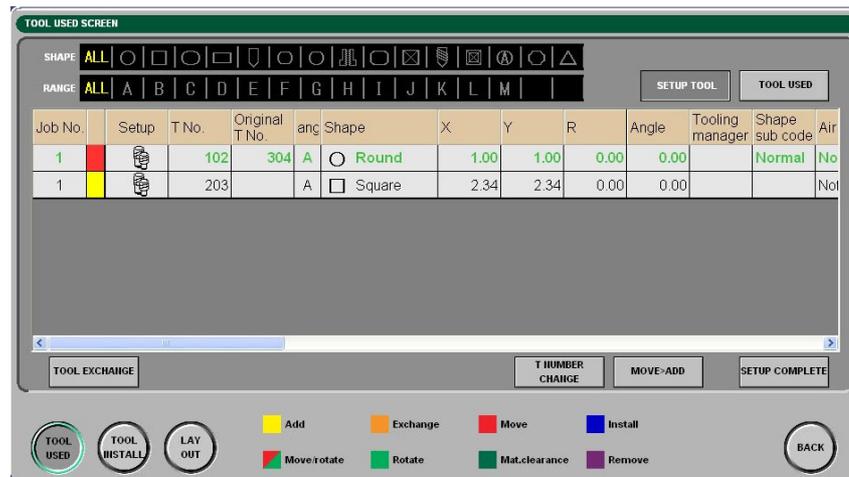
Determine tool setups according to setup instructions.

NOTE

● For further information on the setup display, refer to Part III, Displays.

MATERIAL/CLAMP SETUP
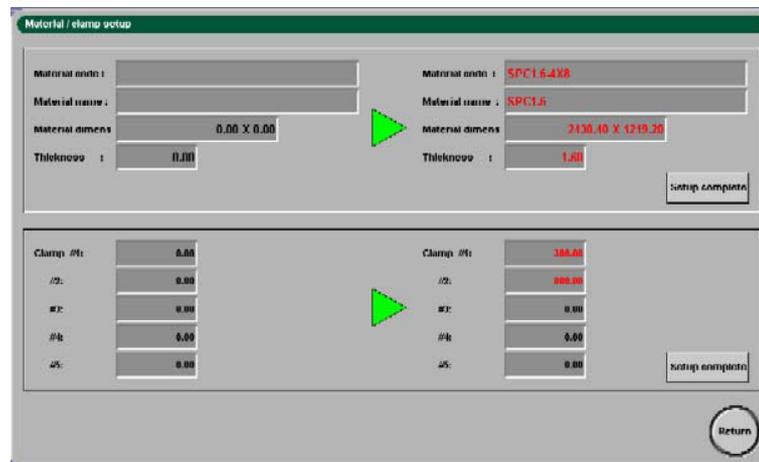
Make worksheet and workclamp setup calculations according to setup instructions.

NOTE

● For further information on the setup display, refer to Part III, Displays.

CHANGING TOOLS

<table>
<tr><td>⚠ WARNING</td><td>● Turn the SAFETY DEVICE keyswitch to SETTING, remove the key from the switch, and keep it by yourself when installing or removing the punches and dies.

● Never touch the turret or tools while the turret is rotating.

● When changing the tools, take care not to drop the tools or to have the fingers pinched between a turret hole and the edge of a punch guide.</td></tr>
</table>

NOTICE

● Before rotating the turret, check that the tools are completely installed in the turret.

● When installing a shaped tool (not a round tool), align the keyway of the punch guide with the key of the upper turret disk so that the punch orients in the same direction as the die.

Moving necessary turret station to tool change position

Move the turret station where a tool is to be removed or installed to the tool change position as described below.

1 Turn the SAFETY DEVICE keyswitch on the main control panel to SETTING.
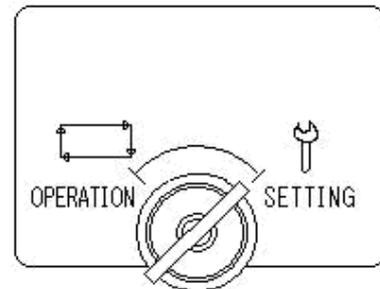
2 Press and illuminate the MANUAL button on the main control panel.

3 Turn the TOOL CHANGE keyswitch on the subcontrol panel "B" to ON.

OFF   ON
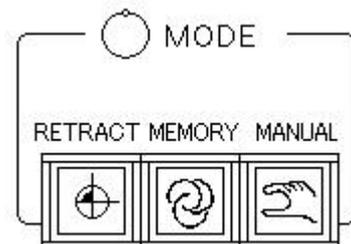
TOOL CHANGE
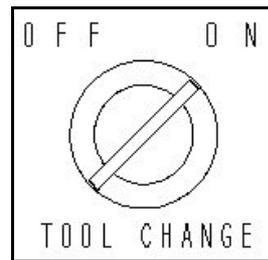
4 Turn the INDEX PIN switch on the subcontrol panel "B" to OUT to remove the turret index pins from the turret.

5 While pressing the TURRET JOG ON button on the subcontrol panel "B", press either TURRET JOG button on the subcontrol panel "B".

The turret rotates as long as the two buttons are pressed.

TURRET JOG
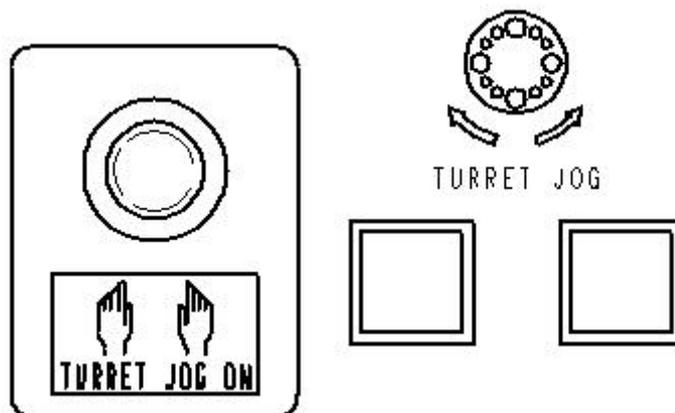
TURRET JOG ON

NOTE

● The turret does not rotate when the tool change door or doors are open.

6 When the desired turret station approaches the tool change position, release the TURRET JOG ON button and TURRET JOG button.

The turret selects the desired station and stops.

7 Open the upper and lower tool change doors.

8 Check the turret station number stamped on the top surface of the upper turret disk, and install or remove the tool in the turret station as described on the following pages.

Changing tools in φ1200 King type-turret

CHANGING TOOLS IN 1/2" AND 1-1/4" STANDARD STATIONS

NOTICE

● When installing a shaped tool, align the punch shape with the hole shape of the die, and insert the punch in the upper turret disk.   Carefully insert the punch by aligning the punch guide with the hole in the upper turret disk.   If the punch is inserted with the punch guide misaligned with the turret hole, the punch guide may be damaged on the side to lead to the galling of the tool.

NOTE

● Before installing punches and dies in the turret, lubricate them with machine oil.   For the lubrication points, refer to Part IX, Tooling.

● Shaped tools cannot be installed in the center track of the 1/2" stations. Round tools can be installed in any tracks.

Installing tools

1   Loosen the bolt fixing the upper die holder.

2   Remove the upper die holder from the lower turret disk.

3   Insert the die through the bottom of the upper die holder.

FIXING BOLT

4   Install the upper die holder in the lower turret disk.

5   Fix the upper die holder with the bolt.

6   Insert the punch in the upper turret disk.

DIE

UPPER DIE HOLDER

NOTICE

● If the punch is inserted with the keyway of the punch guide misaligned with the key in the upper turret disk, the punch guide keyway may be damaged to lead to the galling of the tool.
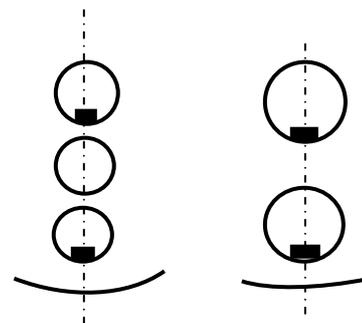
Removing tools

1   Remove the punch from the upper turret disk.

2   Loosen the bolt fixing the upper die holder.

3   Remove the upper die holder from the lower turret disk.

4   Lightly tap the upper part of the die with the standard accessory brass bar.   The die is loosened for easy removal.

5   Remove the die from the upper die holder.

CHANGING TOOLS IN AUTO-INDEX STATIONS

NOTE

● Before installing punches and dies in the turret, lubricate them with machine oil.   For the lubrication points, refer to Part IX, Tooling.

Installing tools

1   Loosen the bolt fixing the die spacer.

2   Remove the die spacer from the lower turret disk.

DIE SPACER

3   Insert the die in the die holder in the lower turret disk.

DIE
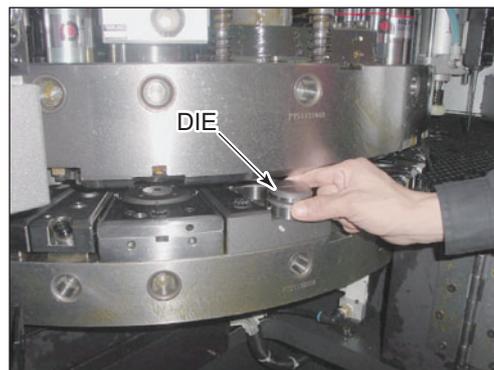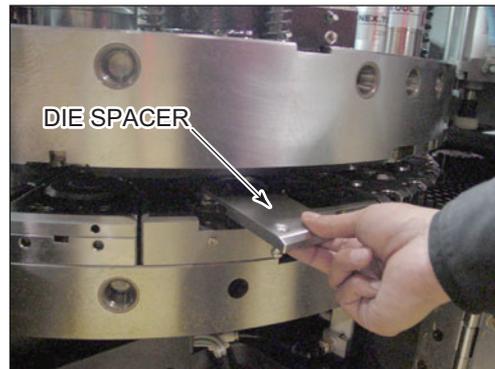
4   Insert the die remover through the bottom of the lower turret disk.

5   Insert the brass bar through the top of the upper turret disk.

6   Hold the die with the die remover and brass bar, and fix the die in the die holder.

7   Install the die spacer, and fix it with the bolt.

8   Install the punch in the upper turret disk.
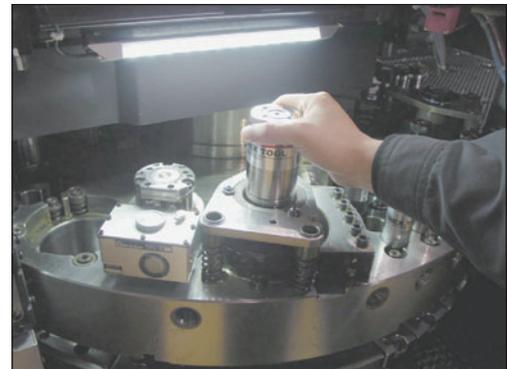
NOTICE

● If the punch is inserted with the keyway of the punch guide misaligned with the key in the upper turret disk, the punch guide keyway may be damaged to lead to the galling of the tool.

Auto-index station
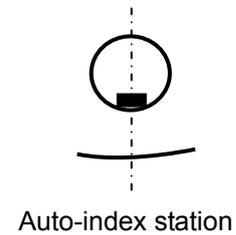
Removing tools

1   Remove the punch from the upper turret disk.

2   Loosen the bolt fixing the die spacer.

3   Remove the die spacer from the lower turret disk.

4   Push up the die with the die remover.

5   Remove the die from the die holder.

CHANGING TOOLS IN 2", 3-1/2", AND 4-1/2" STANDARD STATIONS

NOTICE

● When installing a shaped tool, align the punch shape with the hole shape of the die, and insert the punch in the upper turret disk.   Carefully insert the punch by aligning the punch guide with the hole in the upper turret disk.   If the punch is inserted with the punch guide misaligned with the turret hole, the punch guide may be damaged on the side to lead to the galling of the tool. (Especially, the 4-1/2" stations have the upper turret disk key installed at the rear when seen from front.   Pay attention to its insert direction.)

NOTE

● Before installing punches and dies in the turret, lubricate them with machine oil.   For the lubrication points, refer to Part IX, Tooling.

Installing tools

1   Remove the die spacer from the lower turret disk.

2   Insert the die in the die holder.

3   Insert the brass bar through the bottom of the lower turret disk, and fix the die to the die holder with the brass bar.

4   Install the die spacer in the lower turret disk.

5   Insert the punch in the upper turret disk.
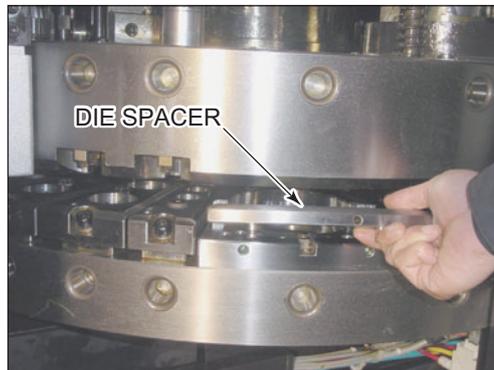
DIE SPACER

BRASS BAR

● If the punch is inserted with the keyway of the punch guide misaligned with the key in the upper turret disk, the punch guide keyway may be damaged to lead to the galling of the tool.
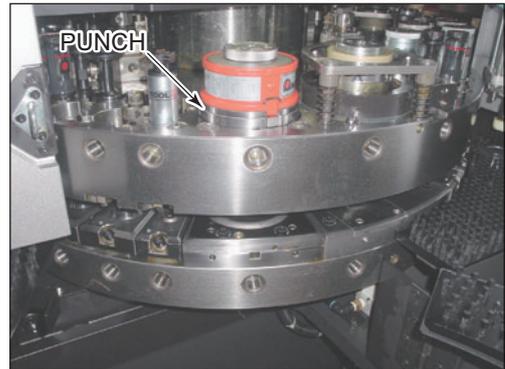
Removing tools

1   Remove the punch from the upper turret disk.

2   Remove the die spacer from the lower turret disk.

3   Insert the brass bar into the station from below the lower turret disk.

4   Push up the die with the brass bar.

5   Remove the die from the clearance between the upper and lower turret disks.

Changing tools in Z type-turret

● When installing a shaped tool, align the punch shape with the hole shape of the die, and insert the punch in the upper turret disk.   Carefully insert the punch by aligning the punch guide with the hole in the upper turret disk.   If the punch is inserted with the punch guide misaligned with the turret hole, the punch guide may be damaged on the side to lead to the galling of the tool.

● Before installing punches and dies in the turret, lubricate them with machine oil.   For the lubrication points, refer to Part IX, Tooling.

1   Lift up the ejector pipe.

2   Place the die on the ejector pipe.

3   Hold the die with the ejector pipe and one hand, and insert it in the die holder.

DIE

DIE HOLDER

EJECTOR PIPE
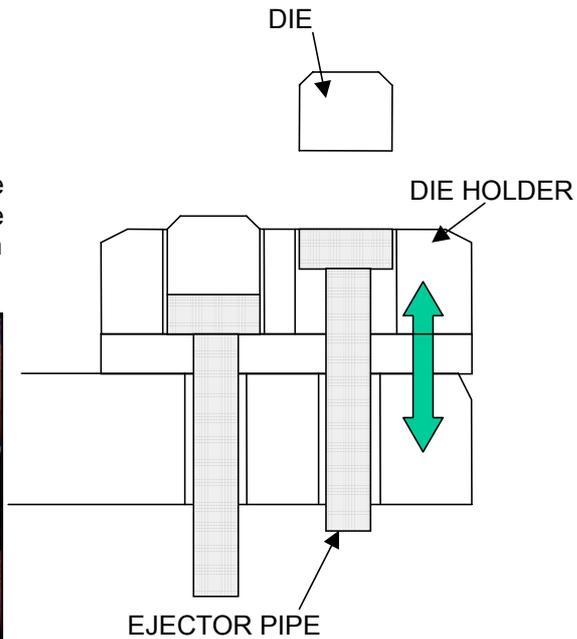
4   Set the punch.

● When installing a special-shaped tool, align the punch shape with the hole shape of the die, and insert the punch in the upper turret.   Carefully insert the punch by aligning the punch guide with the hole in the upper turret.   If the punch is installed with the punch guide misaligned with the turret hole, the punch guide may be damaged on the side to lead to the galling of the tool. (Especially, the 4-1/2" stations have the upper turret key installed at the rear when seen from front.   Pay attention to its insert direction.)

| 1/2" | 1-1/4" | 1-1/4" Al | 2" | 3-1/2" | 4-1/2" |
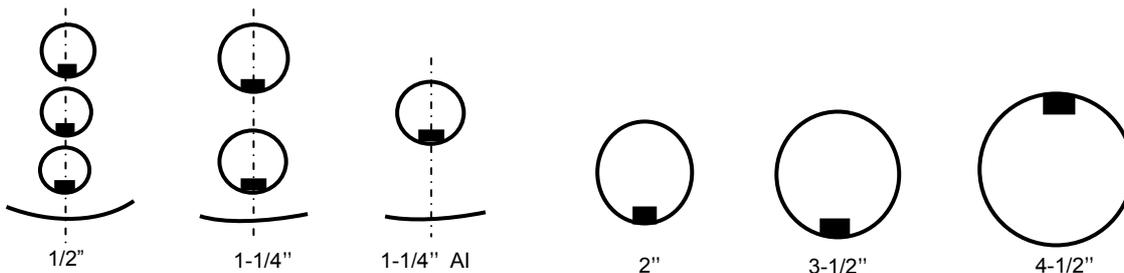
Changing punch with tool balancer

PRESSURE ADJUSTMENT DIAL

AIR CYLINDER

4-1/2

3-1/2

HIGH

LOW

LOW

HI

SCREW

PUNCH

ON

OFF

ON/OFF SWITCH
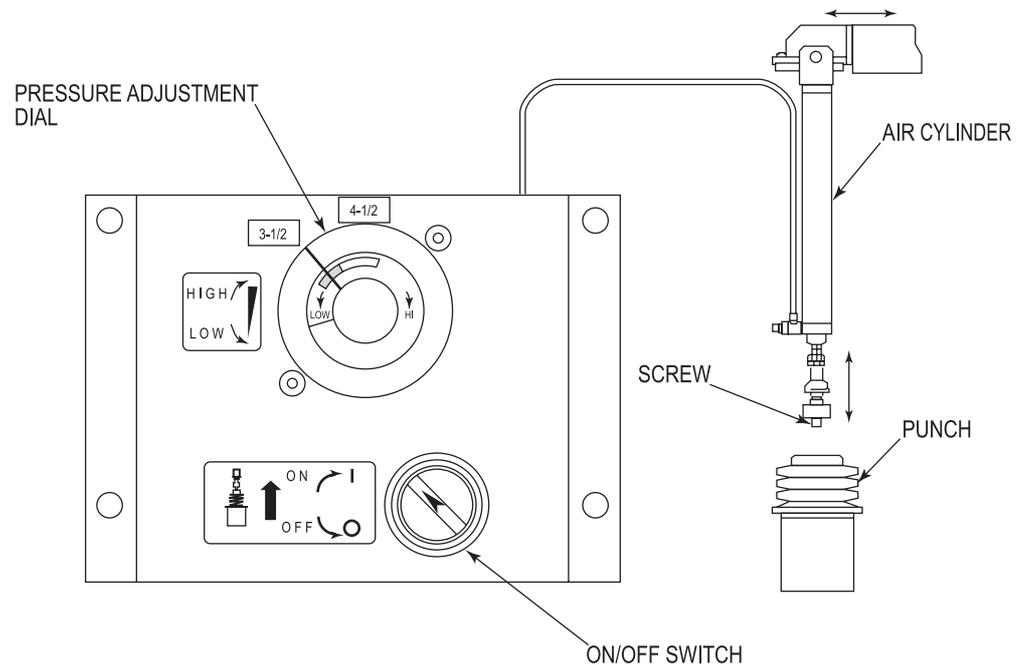
The tool balancer reduces the handling mass of a large-diameter (3-1/2" or larger) punch with the pull-up force of the air cylinder to facilitate the changing of the punch.   While not forgetting to balance the punch, install it in the upper turret disk or remove it from the upper turret disk as described below.

1 Turn the ON/OFF switch on the tool balancer control panel to OFF.

   The tool balancer lowers.

2 Lower the threaded portion of the tool balancer, and screw it into the head of the punch.

3 Turn the pressure adjustment dial on the tool balancer control panel fully to LOW.

4 Turn the ON/OFF switch to ON.

5 Turn the pressure adjustment dial to HIGH to balance the punch.

6 Align the punch shape with the hole shape of the die, and insert the punch in the upper turret disk.   Carefully insert the punch while aligning the punch guide side keyway with the key in the upper turret disk.

   Or remove the punch from the upper turret disk.

   NOTICE

● If the punch is inserted with the punch guide misaligned with the turret hole, the punch guide may be damaged on the side to lead to the galling of the tool.   (Especially, the 4-1/2" stations have the upper turret disk key installed at the rear when seen from front.   Pay attention to its insert direction.)

7 Turn the ON/OFF switch to OFF.

8 Loosen the threaded portion of the tool balancer, and remove it from the head of the punch.

9 After completing the tool change, turn the ON/OFF switch to ON.

The tool balancer rises.

Ending tool change

1 Close the upper and lower tool change doors.

2 Turn the TOOL CHANGE keyswitch on the subcontrol panel "B" to OFF.

3 Turn the SAFETY DEVICE keyswitch on the main control panel to OPERATION.

POSITIONING WORKCLAMPS

Position the workclamps to suit the size of the worksheet to be punched and the program to be executed as described below.

1   Press the foot switch to open the workclamps.

2   Loosen the lever at the top of each workclamp, move the workclamp to the desired position, and tighten the lever.
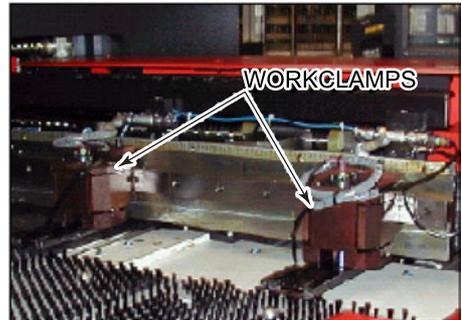
3   When changing the position of a workclamp more greatly than during the last automatic operation, reinstall its air coupler and sensor plug in the nearest places.   Install a blind plug in the empty sensor opening.
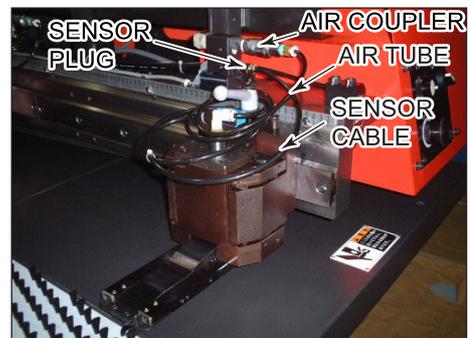
NOTICE

● Fix the air tube and sensor cable with bands or the like so that they do not interfere with the moving parts of the machine.

NOTE

● The workclamps are fitted with proximity switches to check if their top levers are loosened.

● After the top lever of a workclamp is loosened, its proximity switch reads its position at the start of the next automatic operation.

● Check the number of workclamps entered in the "Number of clamps" field on the Setting display, and install the same number of workclamps on the machine.

● Close the open sensor connection port with the supplied blind plug when an unused workclamp is removed.

● To use short workclamps in place of conventional workclamps, set the "The number of clamps" field to 0 on the Setting display, and remove all of the workclamp lever looseness detection sensor plugs.

LOADING WORKSHEET

⚠ CAUTION	● **When clamping a worksheet, take care not to have the fingers pinched in the workclamps.**
	● **When handling a worksheet, wear leather gloves or thick cotton gloves. If you do not wear such gloves, you may get injured at the edges, corners, or burrs of the worksheet.**

Load the worksheet on the table as described below.

1   Check that the workclamps are open.

    If the workclamps are closed, press the foot switch to open them.

2   Check that the workclamps are positioned according to the worksheet size and the program.
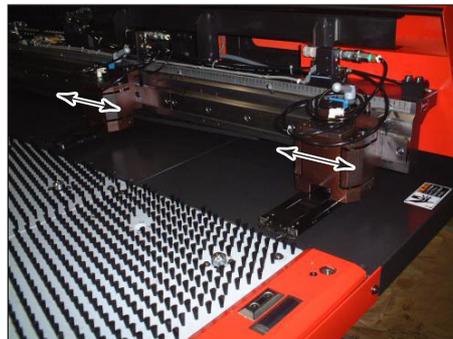
3   Place the worksheet on the table.
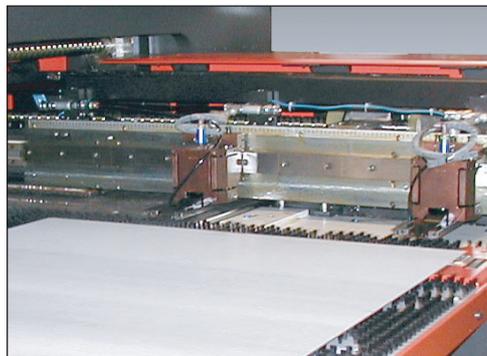
4   Turn the X-GAUGE BLOCK switch on the subcontrol panel "B" to UP.

    The X-gauge block rises.
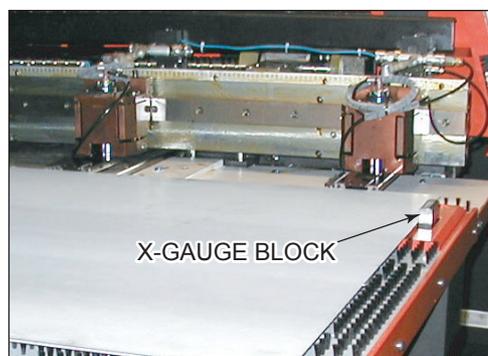
X-GAUGE BLOCK

5   Push the worksheet against the contact plate of each workclamp.

The worksheet is positioned in the Y-axis direction.

> ____NOTICE____
> ● Check that the worksheet is positively pushed against the X-gauge
>   block and workclamps.

6   Push the worksheet against the X-gauge block.

The worksheet is positioned in the X-axis direction.

7   Press the foot switch.

The workclamps close and hold the worksheet.

8   Turn the X-GAUGE BLOCK switch to DOWN.

The X-gauge block lowers.

AUTOMATIC OPERATION

⚠ WARNING	● Before starting the machine, check that there are no workers and obstacles around the machine. Pay particular attention to the rear of the machine.
	● Never enter the travel areas of the machine and worksheet during operation.

⚠ CAUTION	● Before pressing the START button, fully check for safety around the machine.

Starting single-program operation

When the machine is ready for single-program operation, start its single-program operation as described below.

1   Check that the NC READY and TOP DEAD CENTER lights and the lights of the +X, +Y and T buttons on the main control panel are turned on.

2   Check that the SAFETY DEVICE keyswitch on the main control panel is turned to OPERATION.

3   Check that the TOOL CHANGE keyswitch on the subcontrol panel "B" is turned to OFF.

FEED buttons

NC READY light
TOP DEAD CENTER light

SAFETY DEVICE keyswitch
（OPERATION/SETTING）
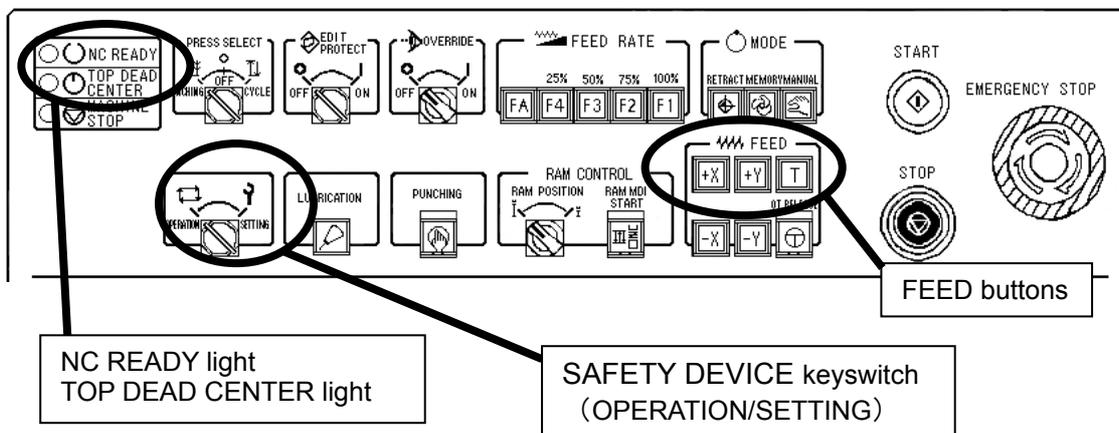
4   Press the PROGRAM button on the screen to open the PROGRAM display.

The program to be executed is shown.

PROGRAM button

Operating mode change buttons

5   Change the automatic operating mode.   Select PROGRAM for the single-program operation.

6   Press and illuminate the MEMORY button on the main control panel.

7   Press the SW. PANEL button on the screen, and set the press speed with a PRESS SPEED button on PANEL A.

8   Set the RAM POSITION switch on the main control panel.

Usually set it to the left position (top dead center).

9   Check that the STRIP MISS button on PANEL B is illuminated.   If it is not illuminated, press the button to turn it on.

10 Set the following controls as required:

On the main control panel

OVERRIDE switch

FEEDRATE buttons

On PANEL A

OPTIONAL STOP button

BLOCK SKIP button

SINGLE BLOCK button

Multiple-part punching setup buttons

On PANEL B

STRIP MISS button

NOTE

● When starting the single-program operation of the machine with a multiple-part punching program, be sure to illuminate any one of the three multiple-part punching setup buttons.   If all of the buttons are extinguished, an alarm will occur during the single-program operation.

When the program is not for multiple-part punching, extinguish all of the three multiple-part punching setup buttons.   If any one of the buttons is illuminated, the program will not be properly executed.

11 Turn the PRESS SELECT keyswitch on the main control panel to CYCLE.

12 Check for safety around the machine.

13 Press the START button on the main control panel.

The light of the START button comes on, and the machine starts its single-program operation according to the program displayed on the screen.

When the single-program operation is started

- "START" appears in the processing status display field.
- The program line being currently executed is shown in yellow.
  - The current position of each axis is shown at the lower left of the screen according to the operation of the machine.

NOTE

● The hit rate may be regulated, depending on the load applied to the press drive motor for a certain period of time during the operation.   During the hit rate regulation, a message to that effect appears in the guide area of the display.   When the circumferential length of the cut is set to a value greater than that of the actual tool, the hit rate is more likely to be regulated.   Check that the circumferential length of the cut is set appropriately.
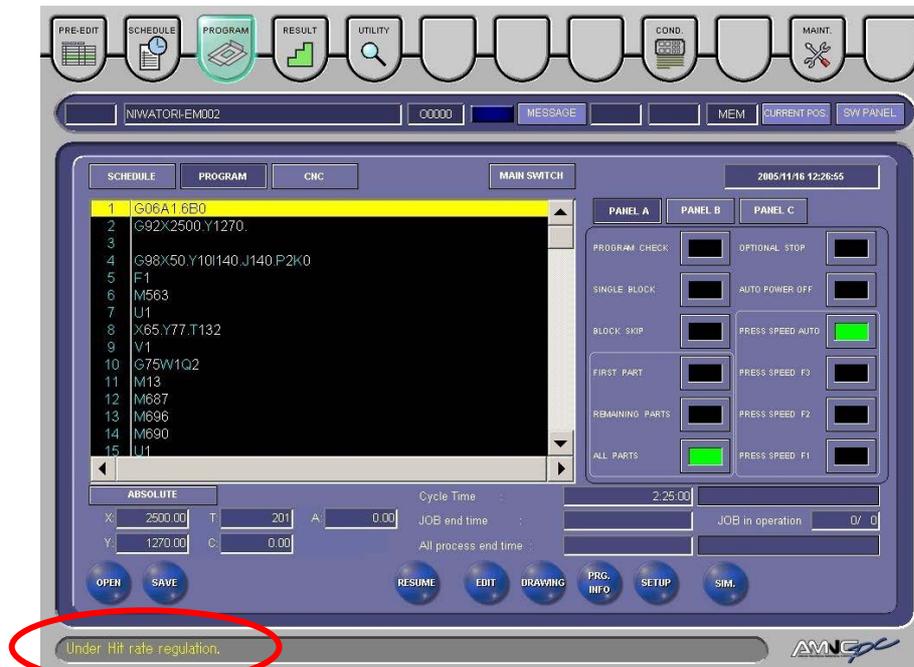
Starting schedule operation

When the machine is ready for schedule operation, start its schedule operation as described below.

1   Check that the NC READY and TOP DEAD CENTER lights and the lights of the +X, +Y and T buttons on the main control panel are turned on.

2   Check that the SAFETY DEVICE keyswitch on the main control panel is turned to OPERATION.

3   Check that the TOOL CHANGE keyswitch on the subcontrol panel "B" is turned to OFF.

FEED buttons

NC READY light
TOP DEAD CENTER light

SAFETY DEVICE keyswitch
（OPERATION/SETTING）
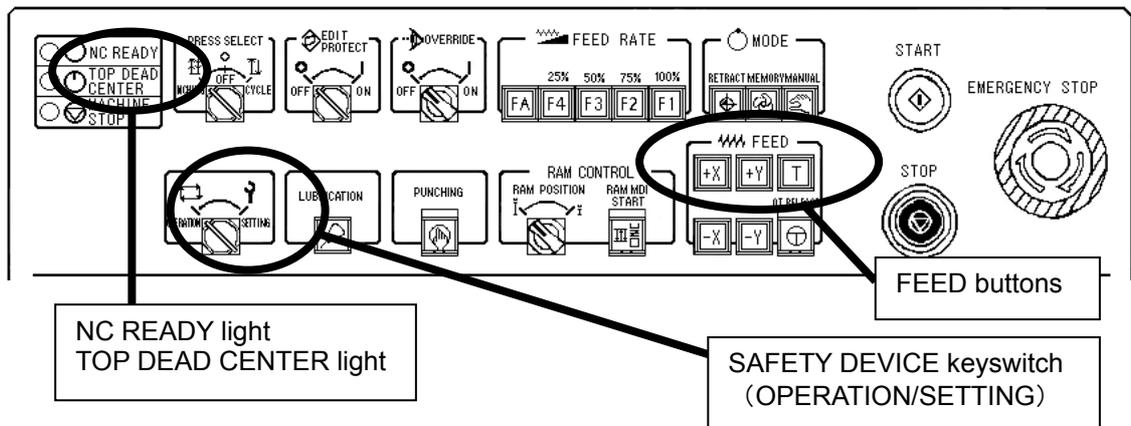
4   Press the SCHEDULE button on the screen to open the SCHEDULE display.

The schedule of the programs to be executed is listed.

SCHEDULE button

Operating mode change buttons
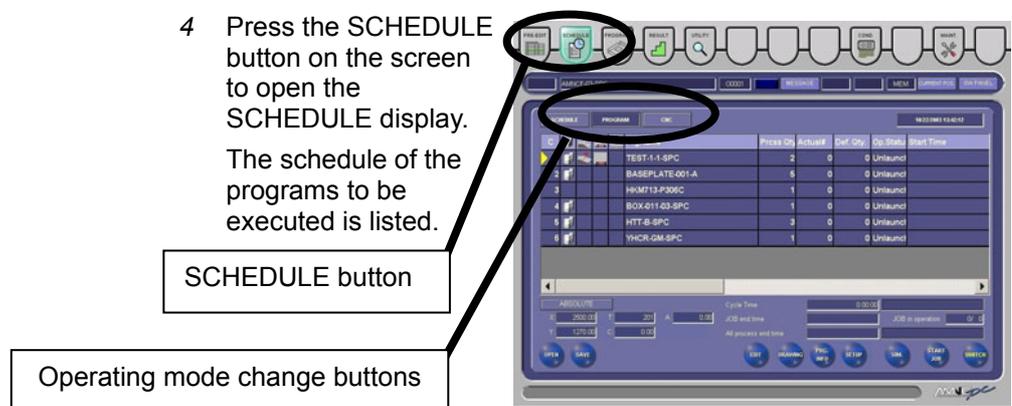
5   Change the automatic operating mode.   Select SCHEDULE for the schedule operation.

6   Select the program from which to start the operation of the machine, and press the START JOB button and OK button.

7   Press and illuminate the MEMORY button on the main control panel.

8   Press the SW. PANEL button on the screen, and set the press speed with a PRESS SPEED   button on PANEL A.

9   Set the RAM POSITION switch on the main control panel.

Usually set it to the left position (top dead center).

10   Check that the STRIP MISS button on PANEL B is illuminated.   If it is not illuminated, press the button to turn it on.

11   Set the following controls as required:

On the main control panel

OVERRIDE switch

FEEDRATE buttons

On PANEL A

OPTIONAL STOP button

BLOCK SKIP button

SINGLE BLOCK button

Multiple-part punching setup buttons

On PANEL B

STRIP MISS button

NOTE

● When starting the schedule operation of the machine with a multiple-part punching program, be sure to illuminate any one of the three multiple-part punching setup buttons.   If all of the buttons are extinguished, an alarm will occur during the schedule operation.

When the program is not for multiple-part punching, extinguish all of the three multiple-part punching setup buttons.   If any one of the buttons is illuminated, the program will not be properly executed.

12   Turn the PRESS SELECT keyswitch on the main control panel to CYCLE.

13   Check for safety around the machine.

14   Press the START button on the main control panel.

The light of the START button comes on, and the machine starts its schedule operation according to the programs listed on the SCHEDULE display.

When the schedule operation is started

•   "START" appears in the processing status display field.

•   The current position of each axis is shown at the lower left of the screen according to the operation of the machine.

NOTE

● Changing the display from SCHEDULE to PROGRAM during the schedule operation allows the current program to be displayed.
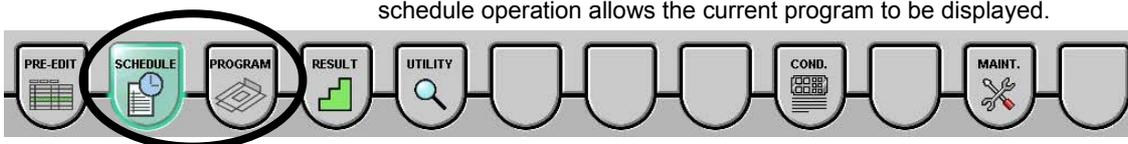
● The hit rate may be regulated, depending on the load applied to the press drive motor for a certain period of time during the operation.   During the hit rate regulation, a message to that effect appears in the guide area of the display.   When the circumferential length of the cut is set to a value greater than that of the actual tool, the hit rate is more likely to be regulated.   Check that the circumferential length of the cut is set appropriately.
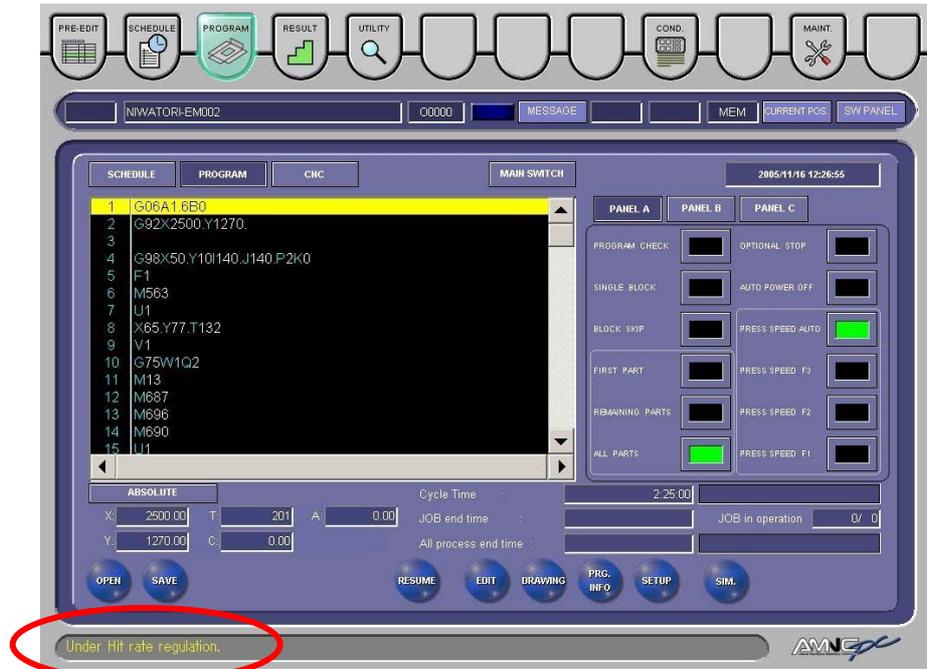
Starting CNC operation

Start the CNC operation of the machine as described below.

1   Check that the NC READY and TOP DEAD CENTER lights and the lights of the +X, +Y and T buttons on the main control panel are turned on.

2   Check that the SAFETY DEVICE keyswitch on the main control panel is turned to OPERATION.

3   Check that the TOOL CHANGE keyswitch on the subcontrol panel "B" is turned to OFF.

FEED buttons

NC READY light
TOP DEAD CENTER light

SAFETY DEVICE keyswitch
（OPERATION/SETTING）

4   Press the PROGRAM button on the screen to open the PROGRAM display.
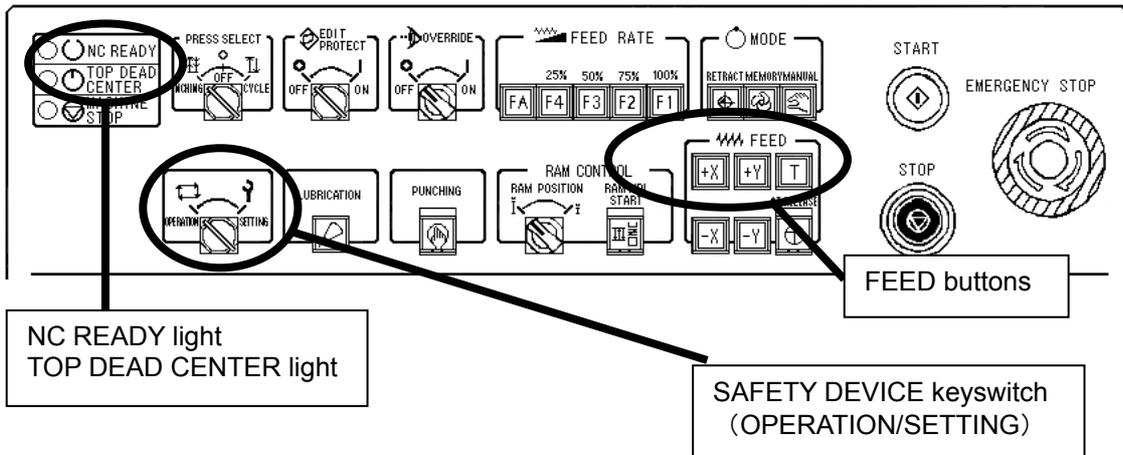
PROGRAM button

Operating mode change buttons
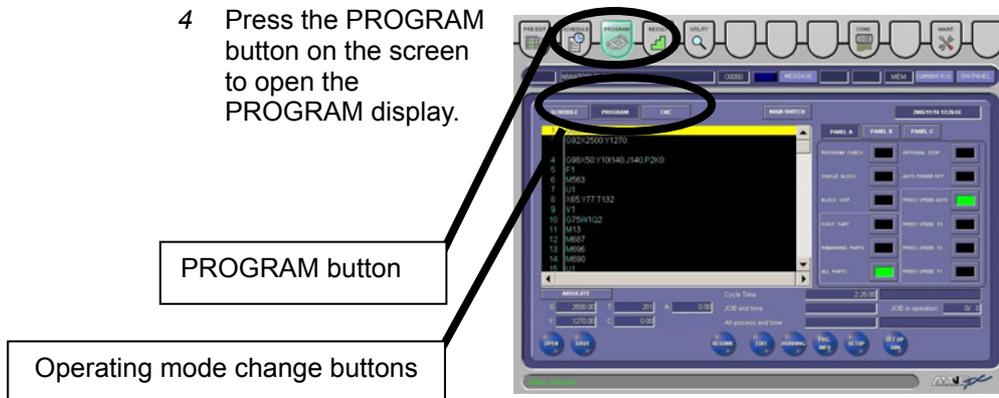
5   Change the automatic operating mode.
Select CNC for the CNC operation.

6   Press and illuminate the MEMORY button on the main control panel to change to the MEMORY mode.

7 Press the READ button to list the programs.
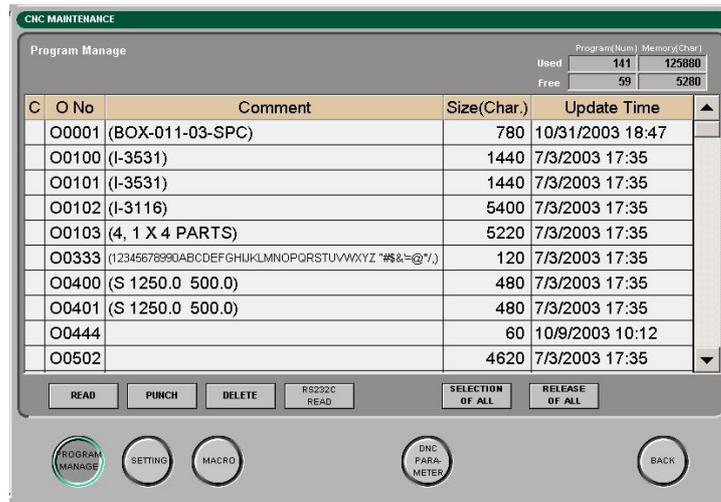
8 Select the program, and press the OK button.

9 Set the press speed with a PRESS SPEED button on PANEL A.

10 Set the RAM POSITION switch on the main control panel.

Usually set it to the left position (top dead center).

11 Check that the STRIP MISS button on PANEL B is illuminated.   If it is not illuminated, press it to illuminate it.

12 Set the following controls as required:

On the main control panel

OVERRIDE switch

FEEDRATE buttons

On PANEL A

OPTIONAL STOP button

BLOCK SKIP button

SINGLE BLOCK button

Multiple-part punching setup buttons

NOTE

● When starting the CNC operation of the machine with a multiple-part punching program, be sure to press and illuminate any one of the three multiple-part punching setup buttons.   If all of the buttons are extinguished, an alarm will occur during the CNC operation.

When the program is not for multiple-part punching, extinguish all of the three multiple-part punching setup buttons.   If any one of the buttons is illuminated, the program will not be properly executed.

13 Turn the PRESS SELECT keyswitch on the main control panel to CYCLE.

14 Check for safety around the machine.

15 Press the START button on the main control panel.

The START button is illuminated, and the machine starts its CNC operation according to the program displayed on the screen.

When the CNC operation is started

• "START" appears in the processing status display field.

• The current position of each axis is shown at the lower left of the screen according to the operation of the machine.

NOTE

● When the REMOTE button on PANEL B is illuminated, the operating mode is the optional DNC operation.   Before starting the CNC operation of the machine, check that the REMOTE button is extinguished.

● During the CNC operation, program editing, drawing, and on-line drawing cannot be performed, and the related buttons are disabled.

● For the method of registering program to be used for CNC operation, refer to Part III, CNC MAINTENANCE button.

NOTE

● The hit rate may be regulated, depending on the load applied to the press drive motor for a certain period of time during the operation.   During the hit rate regulation, a message to that effect appears in the guide area of the display.   When the circumferential length of the cut is set to a value greater than that of the actual tool, the hit rate is more likely to be regulated.   Check that the circumferential length of the cut is set appropriately.
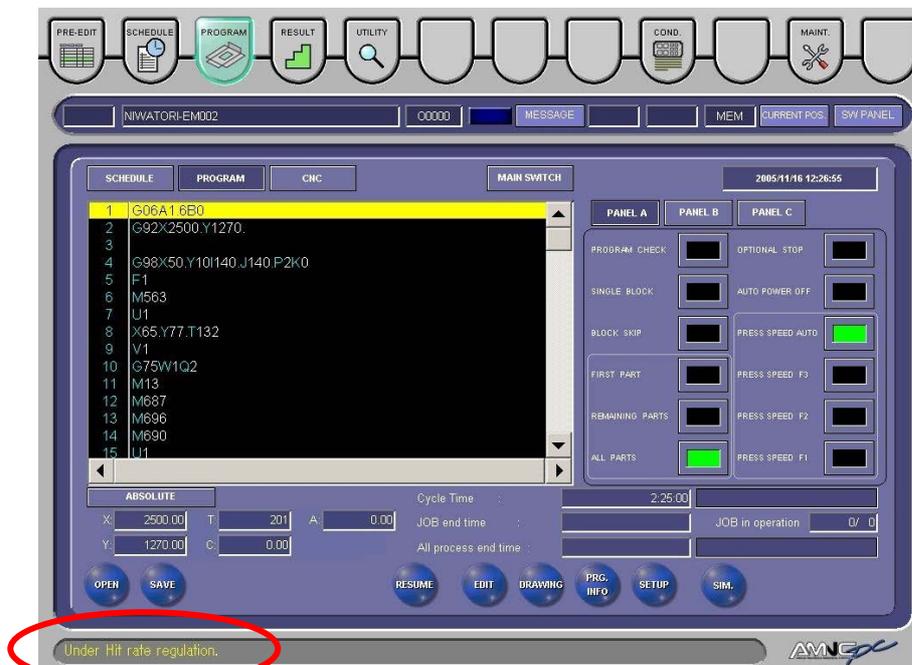
Starting DNC operation

Start the DNC operation of the machine as described below.

1   Check that the NC READY and TOP DEAD CENTER lights and the lights of the +X, +Y and T buttons on the main control panel are turned on.

2   Check that the SAFETY DEVICE keyswitch on the main control panel is turned to OPERATION.

3   Check that the TOOL CHANGE keyswitch on the subcontrol panel "B" is turned to OFF.

NC READY light
TOP DEAD CENTER light

FEED buttons

SAFETY DEVICE keyswitch
（OPERATION/SETTING）

4   Press the PROGRAM button on the screen to open the PROGRAM display.
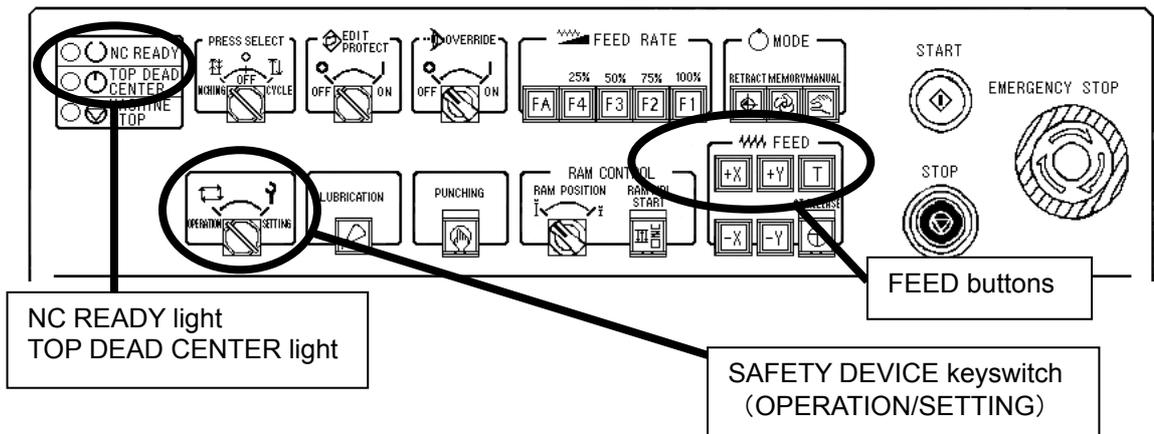
PROGRAM button

Operating mode change buttons
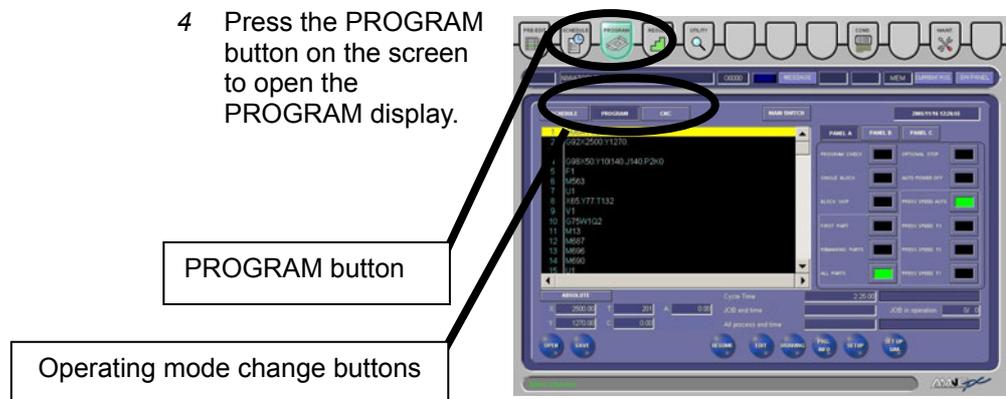
5   Change the automatic operating mode.
    Select CNC for the CNC operation.

6   Check that the REMOTE button on PANEL B is illuminated.   If it
    is not illuminated, press it to illuminate it.

7   Set the press speed with a PRESS SPEED button on PANEL A.

8   Set the RAM POSITION switch on the main control panel.

    Usually set it to the left position (top dead center).

9   Check that the STRIP MISS button on PANEL B is illuminated.   If
    it is not illuminated, press it to illuminate it.

10 Set the following controls as required:

    On the main control panel

    OVERRIDE switch

    FEEDRATE buttons

    On PANEL A

    OPTIONAL STOP button

    BLOCK SKIP button

    SINGLE BLOCK button

    Multiple-part punching setup buttons

    ------------------ NOTE ------------------

    ● When starting the DNC operation of the machine with a multiple-part
       punching program, be sure to press and illuminate any one of the three
       multiple-part punching setup buttons.   If all of the buttons are
       extinguished, an alarm will occur during the DNC operation.

       When the program is not for multiple-part punching, extinguish all of the
       three multiple-part punching setup buttons.   If any one of the buttons is
       illuminated, the program will not be properly executed.

11 Turn the PRESS SELECT keyswitch on the main control panel to
    CYCLE.

12 Check for safety around the machine.

13 Start the DNC operation of the machine from the line control panel,
    connected equipment control panel, or main control panel.

    When the DNC operation is started

    • "START" appears in the processing status display field.

    • The current position of each axis is shown at the lower left of
       the screen according to the operation of the machine.

    • The operating mode RMT is displayed on the screen.

    ------------------ NOTE ------------------

    ● When the REMOTE button on PANEL B is not illuminated, the
       operating mode is the CNC operation.   Before starting the DNC
       operation of the machine, check that the REMOTE button is illuminated.

    ● During the DNC operation, program editing, drawing, and on-line
       drawing cannot be performed, and the related buttons are disabled.

● The hit rate may be regulated, depending on the load applied to the press drive motor for a certain period of time during the operation. During the hit rate regulation, a message to that effect appears in the guide area of the display. When the circumferential length of the cut is set to a value greater than that of the actual tool, the hit rate is more likely to be regulated. Check that the circumferential length of the cut is set appropriately.
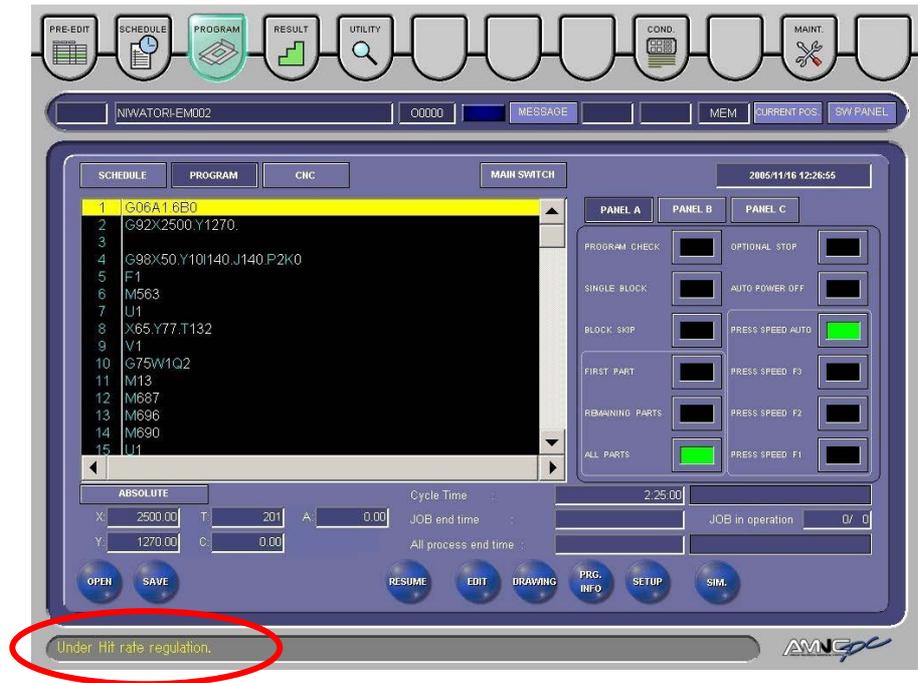
MANUAL OPERATION

The component units of the machine can be operated with the manual controls.

1 Press and illuminate the MANUAL button on the main control panel.
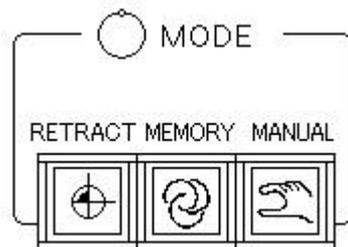
2 Operate the following controls for the manual operation of the machine.

Control panel	Control	Machine operation	Refer to
Main control panel	PUNCHING button	Press operation	Page II-10
	+X and –X buttons	X-axis travel	Page II-11
	+Y and –Y buttons	Y-axis travel	Page II-11
Subcontrol panel "B"	INDEX PIN switch	Turret index pin insertion and withdrawal	Page II-17
	TURRET JOG buttons	Turret rotation	Page II-17
—	Foot switch	Workclamp open/close	Page II-20

CHECKING PROGRAM

Program check is the function of checking the program called to the PROGRAM or SCHEDULE display to see if it is correctly created concerning:

- Syntax
- Overtravel

During the program check, the machine does not operate, but since the program is executed in the NC unit, the coordinates of the X-, Y-, T- and C-axes can be checked according to the values displayed on the screen.

The coordinates can be checked by looking at the processing status display field of the PROGRAM and SCHEDULE displays.   To check the coordinates on a program block basis, enable the single block function.   The optional stop function, block skip function, and subprogram calling function are also enabled as in normal automatic operation.

Perform the program check as described below.

1   Check that the lights of the +X, +Y, and T buttons on the main control panel are turned on.

2   Press and illuminate the MEMORY button on the main control panel.

3   Press the PROGRAM button on the screen to open the PROGRAM display.

4   Press the OPEN button on the PROGRAM display, and call the program you want to check.

5   Press and illuminate the PROGRAM CHECK button on PANEL A.

6   Press and illuminate the SINGLE BLOCK button, OPTIONAL STOP button, and BLOCK SKIP button on PANEL A as required.

7   Press the START button on the main control panel to start checking the program.

   If there is an error, an alarm message appears.   If there are no errors, the program is read to the end to complete the program check.

Clearing program errors

When a program error is found during the program check, an alarm message is shown on the MESSAGE display.   The description, cause, and remedy of the alarm are displayed.   Examine the cause.

Press the RESET key to clear the alarm, and press and extinguish the PROGRAM CHECK button to disable the program check function.

Do as described in "Operation at end of program check" on the next page.   Correct the program, press and illuminate the PROGRAM CHECK button again to enable the program check function, and recheck the program.

Operation at end of program check

1   When the program check is completed, press and extinguish the PROGRAM CHECK button.

2   Press and illuminate the MANUAL button on the main control panel.

3   Press the –X and –Y buttons on the main control panel to move the X- and Y-axes about 200 mm away from their origin.

4   Press and illuminate the RETRACT button on the main control panel.

5   Press the +X and +Y buttons on the main control panel to zero-return the X- and Y-axes.

When the zero-return of the X- and Y-axes is completed, the +X and +Y buttons illuminate.

OPERATION INTERRUPTION

⚠ WARNING	● Before starting the machine (or resuming its automatic operation or zero-returning it), check that there are no workers and obstacles around the machine. Pay particular attention to the rear of the machine.

When any trouble or error occurs during its automatic operation, the machine stops.   The machine also stops when a program stop command is executed or when the STOP button or one of the EMERGENCY STOP buttons is pressed.

When the machine stops, the description, cause, and remedy of the stop condition are shown on the MESSAGE display.

Stop condition

When the machine stops temporarily, the program can be resumed from the stop position by removing the cause of the stop condition.

STOP BUTTON IS PRESSED

When the STOP button is pressed during its automatic operation, each axis of the machine decelerates and stops.

The STOP button illuminates, and a warning message appears on the MESSAGE display.

Resuming operation

If the machine is in such a condition that it can resume its automatic operation, press again the STOP button to clear the stop condition, and press the START button.

If the machine cannot resume its automatic operation, press the RESET key to interrupt the operation, and restart the procedure from zero-return.

PROGRAM STOP (M00) OR OPTIONAL STOP (M01) IS COMMANDED

When a stop command in the program is executed, the machine stops, and "HOLD" appears in the processing status display field on the screen.

Resuming operation

Press the START button to resume the automatic operation of the machine.

SINGLE BLOCK FUNCTION IS ENABLED

When the SINGLE BLOCK button is illuminated, completing each program block stops the machine and illuminates the STOP button.

Resuming operation

Press the START button to resume the automatic operation of the machine.

OVERRIDE DETECTION FUNCTION IS ENABLED

The override detection function detects the position of each workclamp. When the workclamp enters the dead zone region, the override detection function decelerates each axis or stops the striker to prevent the workclamp from being punched.

When the override detection function is enabled (the OVERRIDE switch is turned to ON), entry of a workclamp into its override region shows "Override" or "Dead zone" on the MESSAGE display and stops the machine.

Definitions of regions

Distortion region

Region where a workclamp rides on an adjacent die or free-motion bearing and the worksheet may be distorted when punched in this condition.

"Override" appears on the MESSAGE display.
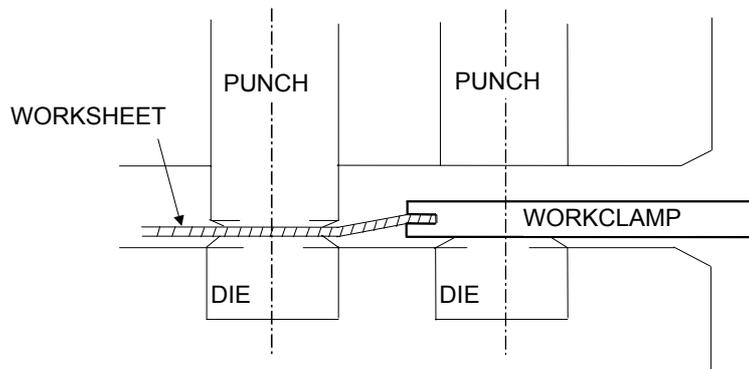
Dead zone region

Region where a workclamp enters a punching position and is punched itself when the worksheet is punched in this condition.

"Dead zone" appears on the MESSAGE display.
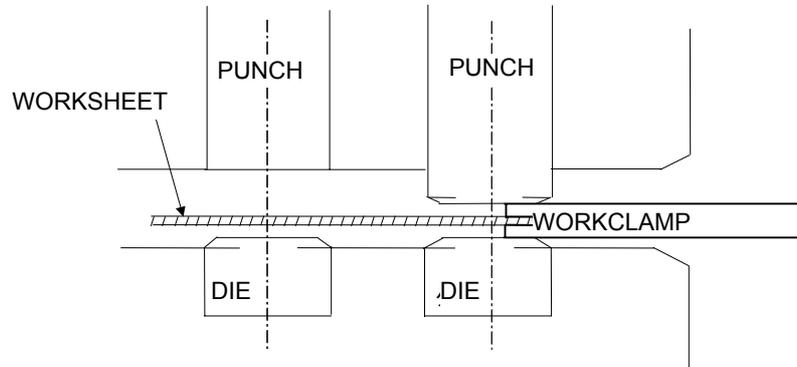
Override region

Distortion region + Dead zone region

External deceleration region

Region where the X- and Y-axes decelerate at a given speed and the punch hits the worksheet, in order to avoid collision between the tools and workclamps.

Second TDC region

Region where the punch hits the worksheet from the second top dead center (or from 6 mm below the normal top dead center), in order to avoid collision between the tools and workclamps.

REGION DIAGRAMS

Values enclosed in brackets are applied when optional clamp positioner is used.

INNER

EXTERNAL DECELERATION REGION 170mm

WORKSHEET DISTORTION REGION 112.5 mm

4-1/2" TOOL SECOND TDC PUNCH REGION

5mm

4-1/2" TOOL DEAD ZONE 88mm

1-1/4" TOOL SECOND TDC PUNCH REGION

1/2" TOOL SECOND TDC PUNCH REGION   1-1/4" TOOL DEAD ZONE 40mm

5mm

1/2" TOOL DEAD ZONE 28mm

0.0mm

WORKCLAMP CENTER

| 270mm [272.5mm] | 182mm [184.5mm] | 118mm [120.5mm] | 58mm [60.5mm] | 70mm [72.5mm] | 0.0mm | 83mm [85.5mm] | 95mm [97.5mm] | 143mm [145.5mm] | 207mm [209.5mm] | 295mm [297.5mm] |

CENTER

EXTERNAL DECELERATION REGION 130 mm

4-1/2" TOOL SECOND TDC PUNCH REGION

5mm

3-1/2" TOOL SECOND TDC PUNCH REGION   4-1/2" TOOL DEAD ZONE 88 mm

WORKSHEET DISTORTION REGION 72.5 mm

3-1/2" TOOL DEAD ZONE 72.5 mm

2" TOOL SECOND TDC PUNCH REGION

1-1/4" TOOL SECOND TDC PUNCH REGION   2" TOOL DEAD ZONE 52 mm

1/2" TOOL SECOND TDC PUNCH REGION   1-1/4" TOOL DEAD ZONE 40 mm

5mm

1/2" TOOL DEAD ZONE 28 mm

0.0mm

WORKCLAMP CENTER

| 270mm [272.5mm] | 182mm [184.5mm] | 118mm [120.5mm] | 102.5mm [105mm] | 82mm [84.5mm] | 70mm [72.5mm] | 58mm [60.5mm] | 0.0mm | 83mm [85.5mm] | 95mm [97.5mm] | 107mm [109.5mm] | 127.5mm [130mm] | 143mm [145.5mm] | 207mm [209.5mm] | 295mm [297.5mm] |

OUTER

EXTERNAL DECELERATION REGION 90 mm

1-1/4" TOOL SECOND TDC PUNCH REGION

1/2" TOOL SECOND TDC PUNCH REGION   1-1/4" TOOL DEAD ZONE 40mm

WORKSHEET DISTORTION REGION 32.5 mm

1/2" TOOL DEAD ZONE 28mm

0.0mm

WORKCLAMP CENTER

| 270mm [272.5mm] | 182mm [184.5mm] | 58mm [60.5mm] | 70mm [72.5mm] | 0.0mm | 83mm [85.5mm] | 95mm [97.5mm] | 207mm [209.5mm] | 295mm [297.5mm] |

Resuming operation

When the workclamps enter the external deceleration region and second TDC region, each axis decelerates, the punch rises, and other procedures are performed as specified for the machine to resume the operation.

When "Override" is shown on the MESSAGE display, check that the worksheet is not likely to distort, and press the START button to resume the operation.
If the worksheet is likely to distort, press first the STOP button and then the RESET key to interrupt the operation. Change the position of the workclamps or correct the program, and restart the procedure from zero-return.

When "Dead zone" is shown on the MESSAGE display, press first the STOP button and then the RESET key to interrupt the operation. Change the position of the workclamps or correct the program, and restart the procedure from zero-return.
If punching can be performed even when a workclamp enters the punch guide ID as is the case with nesting tools, press first the PUNCHING button and then the START button to resume the operation.

NOTICE

● Pressing the PUNCHING button and START button punches the worksheet even in the position where the punch may punch a workclamp. Unless it is confirmed that the workclamp will not be punched, never punch the worksheet in that position.

REPOSITIONING CONFIRMATION FUNCTION IS ENABLED

When the OVERRIDE switch is turned to ON, the override detection function is enabled. When repositioning is then commanded near a workholder, the machine stops. A warning message appears on the MESSAGE display.

Resuming operation

When it is confirmed that repositioning does not bring the workclamps into contact with the workholders, press the START button. The workclamps are repositioned.

When a workclamp is likely to contact a workholder, press the RESET key to interrupt the operation. Change the position of the workclamp or correct the program, and restart the procedure from zero-return.

STRIPPING FAILURE IS DETECTED

When a stripping failure is detected during its automatic operation, the machine stops. A warning message appears on the MESSAGE display.

Resuming operation

Check that the punch is not jammed and that the worksheet is not displaced from the workclamps. When it is confirmed that the punch is fully raised and that the worksheet is not displaced from the workclamps, press the START button to resume the operation.

When there is a punch or worksheet problem, press the RESET key to interrupt the operation, and restart the procedure from zero-return.

X-GAUGE BLOCK IS RAISED

When the X-GAUGE BLOCK switch is turned to UP during its automatic operation, the X-gauge block rises and the machine stops. A warning message appears on the MESSAGE display.

Resuming operation

Turn the X-GAUGE BLOCK switch to DOWN to lower the X-gauge block, and press the START button to resume the operation.

TOOL CHANGE DOOR IS OPENED

When either tool change door is opened during its automatic operation, the machine stops. A warning message appears on the MESSAGE display.

Resuming operation

Close the tool change door, and press the START button to resume the operation.

WORKCLAMPS ARE OPENED

Usually, the workclamps do not open even when the foot switch is pressed during the automatic operation of the machine. When the foot switch is pressed with the machine stopped for another reason, the workclamps open. A warning message appears on the MESSAGE display.

Resuming operation

Press the foot switch to close the workclamps, and press the START button to resume the operation.

When the worksheet is held with the workclamps, it temporarily comes off the workclamps. Check that the worksheet is positioned at the origin of the X-axis before resuming the operation.

SAFETY DEVICE KEYSWITCH IS TURNED TO SETTING

When the SAFETY DEVICE keyswitch is turned to SETTING during the automatic operation of the machine, the X- and Y-axes are locked.   A warning message appears on the MESSAGE display.

Resuming operation

Turn the SAFETY DEVICE keyswitch to OPERATION, and press the START button to resume the operation.

Emergency stop condition

When the machine stops in an emergency, the program cannot be resumed.   Remove the cause of the emergency stop, zero-return the machine, and restart the automatic operation of the machine with the program.

EMERGENCY STOP BUTTON IS PRESSED

As soon as one of the EMERGENCY STOP buttons is pressed during its automatic operation, the machine comes to a total stop.   An alarm message appears on the MESSAGE display.

Resetting

Remove the cause of the emergency stop condition, and turn the pressed EMERGENCY STOP button clockwise to unlock it.   Press the RESET key to close the MESSAGE display.   Restart the procedure from zero-return.

AIR PRESSURE DROPS BELOW SPECIFIED LIMIT

When the air pressure drops below the specified limit during its automatic operation, "AIR DOWN" is shown on the MESSAGE display, and the machine comes to a total stop.

Resetting

Return the air pressure to normal, and press the RESET key to close the MESSAGE display.   Restart the procedure from zero-return.

X-AXIS OR Y-AXIS OVERTRAVEL ALARM OCCURS

When the X-axis or Y-axis overtravels, "X±OT (or Y±OT)" is shown on the MESSAGE display, and the machine comes to a total stop.

Resetting

1 Press and illuminate the MANUAL button.

2 While pressing the OT RELEASE button, press the FEED button in the direction opposite to the overtravel direction to return the axis to the normal stroke length.   (When "X+OT" is shown, for example, press the –X button.)

3 Release the buttons when the axis returns to the normal stroke length.   The NC READY light does not flash, but remains on.

4 Restart the procedure from zero-return.

Interrupting processing

To stop the machine during processing and to zero-return each axis, do as described below.

1 Press the STOP button.

Each axis of the machine decelerates and stops.

2 Press again the STOP button to clear the stop condition.

3 Press the RESET key.

4 Press and illuminate the RETRACT button.

5 Press the +X, +Y, or T button to zero-return the selected axis.
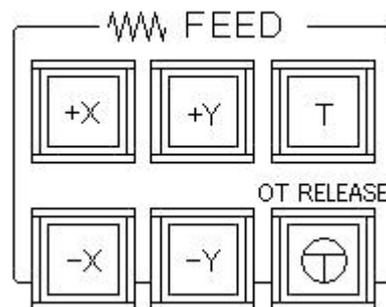
Clearing other stop conditions

When the machine has stopped for another reason, the description, cause, and remedy of the stop condition are shown on the MESSAGE display.   Clear the stop condition as instructed by the message.

SETTING PRESS OPERATING METHOD

During the automatic operation of the machine, the press operating method can be set by changing the switch settings as described below.

Press the SW. PANEL button to open PANEL A.

Manually selecting press speed

NOTICE

● The pressure required for punching the worksheet depends on the circumferential length of the cut edge and the thickness and shear strength of the worksheet.   The punching pressure is calculated from these conditions, and the worksheet is punched at the press speed that corresponds to the calculated punching pressure.   This means that the worksheet may be punched at a speed lower than set by pressing the PRESS SPEED F1 button. In such a case, the worksheet can be punched at a more appropriate press speed by entering the cut edge circumferential length of the punch in the Cut Line field on the TOOLING DATA display.
This speed selection is effective for punching mode commands (M500 and M501), but not for other press mode commands (forming, marking, knockout, slitting, and nibbling).

Press and illuminate one of the PRESS SPEED buttons F1 to F3 to change the press speed (punching speed) automatically set in the NC unit. The NC unit executes the operation at the slower speed out of the specified speeds and the speed commanded with the M code.

F1 is the highest speed for assuring high productivity, and F3 is the lowest speed for alleviating punching noise.

This speed selection is effective for punching mode commands (M500 and M501), but not for other press mode commands (forming, marking, knockout, slitting, and nibbling).

Automatically setting press speed

When the PRESS SPEED AUTO button is pressed and illuminated, the press speed (punching speed) is automatically set to suit the worksheet material and thickness and the tool size.

When pressing and illuminating the PRESS SPEED AUTO button, the time zone selection and the use of M681 to M683 (punching speed command) in the program affect the punching speed as shown in the table below.

M681: Punching speed 1 (high)

M682: Punching speed 2 (medium)

M683: Punching speed 3 (low)

Case	Auto Timer Switch	Punching speed command (M681 to M683)	Time zone		
			Day	Night	Midnight
1	ON	No	High speed (Auto)	Medium speed (Auto)	Low speed (Auto)
2		Yes	Slower speed out of speed specified on the time zone and speed commanded with M-code		
3	OFF	No	High speed (Auto)		
4		Yes	Speed commanded by M-code		

Case 1: Auto Timer switch set to ON and M681 to M683 "No"

In this case, the NC unit automatically sets the punching speed to suit the worksheet material and thickness and the tool size.

The punching speed automatically changes among high, medium, and low speeds according to the time zones preset on the AUTO TIMER display.

For the method of setting the time zones, refer to Part V, Press axis control parameters.

Case 2: Auto Timer switch set to ON and M681 to M683 "Yes"

In this case, the NC unit changes the press speed automatically for the time zones.   It compares the selected speed automatically for the time zone set on the AUTO TIMER display and the speed commanded with the M code and selects the slower speed.

For the method of setting the time zones, refer to Part V, Press axis control parameters.

Case 3: Auto Timer switch set to OFF and M681 to M683 "No"

In this case, the punching speed does not change with the time zone. It is automatically set to suit the worksheet material and thickness and the tool size.

Case 4: Auto Timer switch set to OFF and M681 to M683 "Yes"

In this case, the punching speed does not change with the time zone. It is as commanded by an M-code.

TURNING OFF POWER (SHUTTING DOWN SYSTEM)

NOTICE

● When turning off the power of the NC unit, follow the specified procedure. If the specified procedure is not followed, the NC unit may fail.

● After the POWER ON button on the main control panel is extinguished, turn the machine circuit breaker switch on the electrical control cabinet to OFF. If the machine circuit breaker switch is turned to OFF with the POWER ON button illuminated, the hard disk drive may fail.

End the operation of the machine as described below.

1 Press the POWER OFF button on the main control panel.
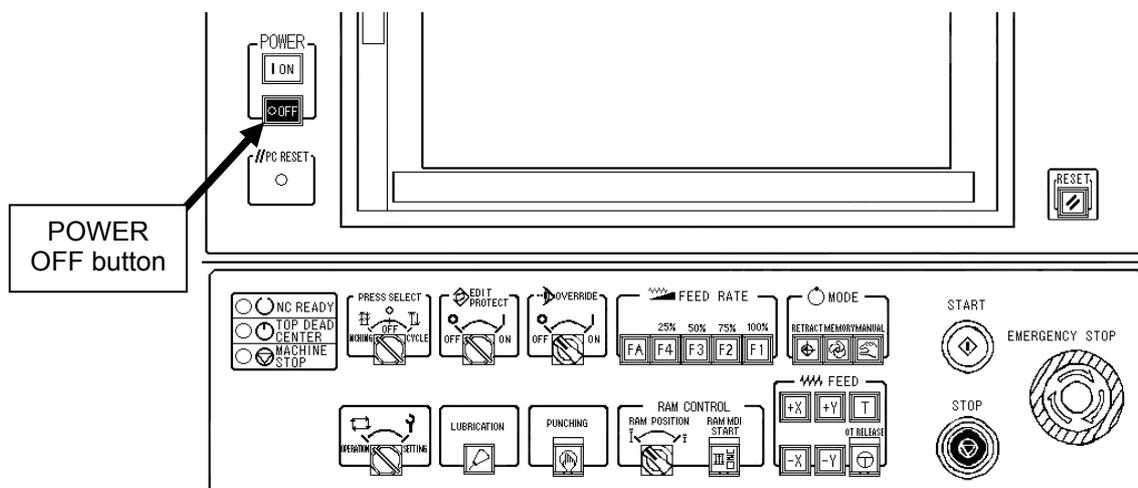
POWER OFF button

2 After the POWER ON button on the main control panel is extinguished, turn the machine circuit breaker switch on the electrical control cabinet to OFF.

The power of the machine and the NC unit is turned off.

3 Turn off the power of the air compressor.

4 Turn off the shop circuit breaker switch.

Part VII

Alarms

Common to EM US series

DESCRIPTION

When the machine develops an alarm, the screen automatically changes to the MESSAGE display.   The MESSAGE display shows the number and message for the alarm.   Clear the alarm by referring to the pages that follow.

Classification	Number
Program alarms	000 to 253 4500 to 5455
Background edit alarms	???, 140
Pulse coder alarms	300 to 387
Servo alarms	401 to 468 600 to 607
Overtravel alarms	500 to 515
Overheat alarms	700 to 704
Rigid tapping alarms	740 to 742
System alarms	900 to 976
PMC alarms	1000 to 2910
Custom macro alarms	3004 to 3161

NOTE

● The alarm lists given on the following pages include all of the alarms that can be displayed by the NC unit.   In other words, alarms not related to the operation and programming of the machine are included.

(1) PROGRAM ALARMS

Number	Message	Contents
000	PLEASE TURN OFF POWER	A parameter which requires the power off was input, turn off power.
001	TH PARITY ALARM	TH alarm (A character with incorrect parity was input). Correct the tape.
002	TV PARITY ALARM	TV alarm (The number of characters in a block is odd). This alarm will be generated only when the TV check is effective.
003	TOO MANY DIGITS	Data exceeding the maximum allowable number of digits was input. (Refer to the item of max. programmable dimensions.)
004	ADDRESS NOT FOUND	A numeral or the sign " – " was input without an address at the beginning of a block. Modify the program .
005	NO DATA AFTER ADDRESS	The address was not followed by the appropriate data but was followed by another address or EOB code. Modify the program.
006	ILLEGAL USE OF NEGATIVE SIGN	Sign " – " input error (Sign " – " was input after an address with which it cannot be used. Or two or more " – " signs were input.) Modify the program.
007	ILLEGAL USE OF DECIMAL POINT	Decimal point " . " input error (A decimal point was input after an address with which it can not be used. Or two decimal points were input.) Modify the program.
009	ILLEGAL ADDRESS INPUT	Unusable character was input in significant area. Modify the program.
010	IMPROPER G–CODE	An unusable G code or G code corresponding to the function not provided is specified. Modify the program.
011	NO FEEDRATE COMMANDED	Feedrate was not commanded to a cutting feed or the feedrate was inadequate. Modify the program.
014	CAN NOT COMMAND G95 (M series)	A synchronous feed is specified without the option for threading / synchronous feed.
014	ILLEGAL LEAD COMMAND (T series)	In variable lead threading, the lead incremental and decremental outputted by address K exceed the maximum command value or a command such that the lead becomes a negative value is given. Modify the program.
015	TOO MANY AXES COMMANDED (M series)	An attempt was made to move the machine along the axes, but the number of the axes exceeded the specified number of axes controlled simultaneously. Modify the program.
015	TOO MANY AXES COMMANDED (T series)	An attempt has been made to move the tool along more than the maximum number of simultaneously controlled axes. Alternatively, no axis movement command or an axis movement command for two or more axes has been specified in the block containing the command for skip using the torque limit signal (G31 P99/98). The command must be accompanied with an axis movement command for a single axis, in the same block.
020	OVER TOLERANCE OF RADIUS	In circular interpolation (G02 or G03), difference of the distance between the start point and the center of an arc and that between the end point and the center of the arc exceeded the value specified in parameter No. 3410.
021	ILLEGAL PLANE AXIS COMMANDED	An axis not included in the selected plane (by using G17, G18, G19) was commanded in circular interpolation. Modify the program.
022	NO CIRCLE RADIUS	The command for circular interpolation lacks arc radius R or coordinate I, J, or K of the distance between the start point to the center of the arc.

Number	Message	Contents
023	ILLEGAL RADIUS COMMAND (T series)	In circular interpolation by radius designation, negative value was commanded for address R. Modify the program.
025	CANNOT COMMAND F0 IN G02/G03 (M series)	F0 (fast feed) was instructed by F1 –digit column feed in circular interpolation. Modify the program.
027	NO AXES COMMANDED IN G43/G44 (M series)	No axis is specified in G43 and G44 blocks for the tool length offset type C. Offset is not canceled but another axis is offset for the tool length offset type C. Modify the program.
028	ILLEGAL PLANE SELECT	In the plane selection command, two or more axes in the same direction are commanded. Modify the program.
029	ILLEGAL OFFSET VALUE (M series)	The offset values specified by H code is too large. Modify the program.
029	ILLEGAL OFFSET VALUE (T series)	The offset values specified by T code is too large. Modify the program.
030	ILLEGAL OFFSET NUMBER (M series)	The offset number specified by D/H code for tool length offset, cutter compensation, or three–dimensional tool offset is too large. Alternatively, the number of an additional workpiece coordinate system specified with the P code is too large. Modify the program.
030	ILLEGAL OFFSET NUMBER (T series)	The offset number in T function specified for tool offset is tool large. Modify the program.
031	ILLEGAL P COMMAND IN G10	In setting an offset amount by G30, the offset number following address P was excessive or it was not specified. Modify the program.
032	ILLEGAL OFFSET VALUE IN G10	In setting an offset amount by G30 or in writing an offset amount by system variables, the offset amount was excessive.
033	NO SOLUTION AT CRC (M series)	A point of intersection cannot be determined for cutter compensation. Modify the program.
033	NO SOLUTION AT CRC (T series)	A point of intersection cannot be determined for tool nose radius compensation. Modify the program.
034	NO CIRC ALLOWED IN ST–UP /EXT BLK (M series)	The start up or cancel was going to be performed in the G02 or G03 mode in cutter compensation C. Modify the program.
034	NO CIRC ALLOWED IN ST–UP /EXT BLK (T series)	The start up or cancel was going to be performed in the G02 or G03 mode in tool nose radius compensation. Modify the program.
035	CAN NOT COMMANDED G39 (M series)	G39 is commanded in cutter compensation B cancel mode or on the plane other than offset plane. Modify the program.
035	CAN NOT COMMANDED G31 (T series)	Skip cutting (G31) was specified in tool nose radius compensation mode. Modify the program.
036	CAN NOT COMMANDED G31 (M series)	Skip cutting (G31) was specified in cutter compensation mode. Modify the program.
037	CAN NOT CHANGE PLANE IN CRC (M seires)	G40 is commanded on the plane other than offset plane in cutter compensation B. The plane selected by using G17, G18 or G19 is changed in cutter compensation C mode. Modify the program.
037	CAN NOT CHANGE PLANE IN NRC (T seires)	The offset plane is switched in tool nose radius compensation. Modify the program.
038	INTERFERENCE IN CIRCULAR BLOCK (M seires)	Overcutting will occur in cutter compensation C because the arc start point or end point coincides with the arc center. Modify the program.
038	INTERFERENCE IN CIRCULAR BLOCK (T series)	Overcutting will occur in tool nose radius compensation because the arc start point or end point coincides with the arc center. Modify the program.

Number	Message	Contents
039	CHF/CNR NOT ALLOWED IN NRC (T series)	Chamfering or corner R was specified with a start–up, a cancel, or switching between G41 and G42 in tool nose radius compensation. The program may cause overcutting to occur in chamfering or corner R. Modify the program.
040	INTERFERENCE IN G90/G94 BLOCK (T series)	Overcutting will occur in tool nose radius compensation in canned cycle G90 or G94. Modify the program.
041	INTERFERENCE IN CRC (M seires)	Overcutting will occur in cutter compensation C. Two or more blocks are consecutively specified in which functions such as the auxiliary function and dwell functions are performed without movement in the cutter compensation mode. Modify the program.
	INTERFERENCE IN NRC (T seires)	Overcutting will occur in tool nose radius compensation. Modify the program.
042	G45/G48 NOT ALLOWED IN CRC (M series)	Tool offset (G45 to G48) is commanded in cutter compensation. Modify the program.
044	G27–G30 NOT ALLOWED IN FIXED CYC (M series)	One of G27 to G30 is commanded in canned cycle mode. Modify the program.
045	ADDRESS Q NOT FOUND (G73/G83) (M series)	In canned cycle G73/G83, the depth of each cut (Q) is not specified. Alternatively, Q0 is specified. Correct the program.
046	ILLEGAL REFERENCE RETURN COMMAND	Other than P2, P3 and P4 are commanded for 2nd, 3rd and 4th reference position return command.
047	ILLEGAL AXIS SELECT	Two or more parallel axes (in parallel with a basic axis) have been specified upon start–up of three–dimensional tool compensation or three–dimensional coordinate conversion.
048	BASIC 3 AXIS NOT FOUND	Start–up of three–dimensional tool compensation or three–dimensional coordinate conversion has been attempted, but the three basic axes used when Xp, Yp, or Zp is omitted are not set in parameter No. 1022.
049	ILLEGAL OPERATION (G68/G69) (M series)	The commands for three–dimensional coordinate conversion (G68, G69) and tool length compensation (G43, G44, G45) are not nested. Modify the program.
050	CHF/CNR NOT ALLOWED IN THRD BLK (M series)	Optional chamfering or corner R is commanded in the thread cutting block. Modify the program.
	CHF/CNR NOT ALLOWED IN THRD BLK(T series)	Chamfering or corner R is commanded in the thread cutting block. Modify the program.
051	MISSING MOVE AFTER CHF/CNR (M series)	Improper movement or the move distance was specified in the block next to the optional chamfering or corner R block. Modify the program.
	MISSING·MOVE AFTER CHF/CNR (T series)	Improper movement or the move distance was specified in the block next to the chamfering or corner R block. Modify the program.
052	CODE IS NOT G01 AFTER CHF/CNR (M series)	The block next to the chamfering or corner R block is not G01,G02 or G03. Modify the program.
	CODE IS NOT G01 AFTER CHF/CNR (T series)	The block next to the chamfering or corner R block is not G01. Modify the program.
053	TOO MANY ADDRESS COMMANDS (M series)	For systems without the arbitary angle chamfering or corner R cutting, a comma was specified. For systems with this feature, a comma was followed by something other than R or C Correct the program.
	TOO MANY ADDRESS COMMANDS (T seires)	In the chamfering and corner R commands, two or more of I, K and R are specified. Otherwise, the character after a comma(",") is not C or R in direct drawing dimensions programming. Modify the program.
054	NO TAPER ALLOWED AFTER CHF/ CNR (T series)	A block in which chamfering in the specified angle or the corner R was specified includes a taper command. Modify the program.

Number	Message	Contents
055	MISSING MOVE VALUE IN CHF/CNR (M series)	In the arbitrary angle chamfering or corner R block, the move distance is less than chamfer or corner R amount.
	MISSING MOVE VALUE IN CHF/CNR (T series)	In chamfering or corner R block, the move distance is less than chamfer or corner R amount.
056	NO END POINT & ANGLE IN CHF/CNR (T series)	Neither the end point nor angle is specified in the command for the block next to that for which only the angle is specified (A). In the chamfering comman, I(K) is commanded for the X(Z) axis.
057	NO SOLUTION OF BLOCK END (T series)	Block end point is not calculated correctly in direct dimension drawing programming.
058	END POINT NOT FOUND (M series)	In a arbitrary angle chamfering or corner R cutting block, a specified axis is not in the selected plane. Correct the program.
	END POINT NOT FOUND (T series)	Block end point is not found in direct dimension drawing programming.
059	PROGRAM NUMBER NOT FOUND	In an external program number search, a specified program number was not found. Otherwise, a program specified for searching is being edited in background processing. Alternatively, the program with the program number specified in a one-touch macro call is not found in memory. Check the program number and external signal. Or discontinue the background eiting.
060	SEQUENCE NUMBER NOT FOUND	Commanded sequence number was not found in the sequence number search. Check the sequence number.
061	ADDRESS P/Q NOT FOUND IN G70–G73 (T series)	Address P or Q is not specified in G70, G71, G72, or G73 command. Modify the program.
062	ILLEGAL COMMAND IN G71–G76 (T series)	1. The depth of cut in G71 or G72 is zero or negative value. 2. The repetitive count in G73 is zero or negative value. 3. the negative value is specified to Δi or Δk is zero in G74 or G75. 4. A value other than zero is specified to address U or W though Δi or Δk is zero in G74 or G75. 5. A negative value is specified to Δd, though the relief direction in G74 or G75 is determined. 6. Zero or a negative value is specified to the height of thread or depth of cut of first time in G76. 7. The specified minimum depth of cut in G76 is greater than the height of thread. 8. An unusable angle of tool tip is specified in G76. Modify the program.
063	SEQUENCE NUMBER NOT FOUND (T series)	The sequence number specified by address P in G70, G71, G72, or G73 command cannot be searched. Modify the program.
064	SHAPE PROGRAM NOT MONOTO-NOUSLY (T series)	A target shape which cannot be made by monotonic machining was specified in a repetitive canned cycle (G71 or G72).
065	ILLEGAL COMMAND IN G71–G73 (T series)	1. G00 or G01 is not commanded at the block with the sequence number which is specified by address P in G71, G72, or G73 command. 2. Address Z(W) or X(U) was commanded in the block with a sequence number which is specified by address P in G71 or G72, respectively. Modify the program.
066	IMPROPER G–CODE IN G71–G73 (T series)	An unallowable G code was commanded beween two blocks specified by address P in G71, G72, or G73. Modify the program.
067	CAN NOT ERROR IN MDI MODE (T series)	G70, G71, G72, or G73 command with address P and Q. Modify the program.

Number	Message	Contents
069	FORMAT ERROR IN G70–G73 (T series)	The final move command in the blocks specified by P and Q of G70, G71, G72, and G73 ended with chamfering or corner R. Modify the program.
070	NO PROGRAM SPACE IN MEMORY	The memory area is insufficient. Delete any unnecessary programs, then retry.
071	DATA NOT FOUND	The address to be searched was not found. Or the program with specified program number was not found in program number search. Check the data.
072	TOO MANY PROGRAMS	The number of programs to be stored exceeded 63 (basic), 125 (option), 200 (option), 400 (option) or 1000 (option). Delete unnecessary programs and execute program registeration again.
073	PROGRAM NUMBER ALREADY IN USE	The commanded program number has already been used. Change the program number or delete unnecessary programs and execute program registeration again.
074	ILLEGAL PROGRAM NUMBER	The program number is other than 1 to 9999. Modify the program number.
075	PROTECT	An attempt was made to register a program whose number was protected.
076	ADDRESS P NOT DEFINED	Address P (program number) was not commanded in the block which includes an M96, G95, or G96 command. Modify the program.
077	SUB PROGRAM NESTING ERROR	The subprogram was called in five folds. Modify the program.
078	NUMBER NOT FOUND	A program number or a sequence number which was specified by address P in the block which includes an M96, M97, G95 or G96 was not found. The sequence number specified by a GOTO statement was not found. Otherwise, a called program is being edited in background processing. Correct the program, or discontinue the background editing.
079	PROGRAM VERIFY ERROR	In memory or program collation, a program in memory does not agree with that read from an external I/O device. Check both the programs in memory and those from the external device.
080	G37 ARRIVAL SIGNAL NOT ASSERTED (M series)	In the automatic tool length measurement function (G37), the measurement position reach signal (XAE, YAE, or ZAE) is not turned on within an area specified in parameter 6254 6255 (value ε). This is due to a setting or operator error.
080	G37 ARRIVAL SIGNAL NOT ASSERTED (T series)	In the automatic tool compensation function (G36, G37), the measurement position reach signal (XAE or ZAE) is not turned on within an area specified in parameter 6254 (value ε). This is due to a setting or operator error.
081	OFFSET NUMBER NOT FOUND IN G37 (M series)	Tool length automatic measurement (G37) was specified without a H code. (Automatic tool length measurement function) Modify the program.
081	OFFSET NUMBER NOT FOUND IN G37 (T series)	Automatic tool compensation (G36, G37) was specified without a T code. (Automatic tool compensation function) Modify the program.
082	H–CODE NOT ALLOWED IN G37 (M series)	H code and automatic tool compensation (G37) were specified in the same block. (Automatic tool length measurement function) Modify the program.
082	T–CODE NOT ALLOWED IN G37 (T series)	T code and automatic tool compensation (G36, G37) were specified in the same block. (Automatic tool compensation function) Modify the program.
083	ILLEGAL AXIS COMMAND IN G37 (M series)	In automatic tool length measurement, an invalid axis was specified or the command is incremental. Modify the program.
083	ILLEGAL AXIS COMMAND IN G37 (T series)	In automatic tool compensation (G36, G37), an invalid axis was specified or the command is incremental. Modify the program.

Number	Message	Contents
085	COMMUNICATION ERROR	When entering data in the memory by using Reader / Puncher interface, an overrun, parity or framing error was generated. The number of bits of input data or setting of baud rate or specification No. of I/O unit is incorrect.
086	DR SIGNAL OFF	When entering data in the memory by using Reader / Puncher interface, the ready signal (DR) of reader / puncher was turned off. Power supply of I/O unit is off or cable is not connected or a P.C.B. is defective.
087	BUFFER OVERFLOW	When entering data in the memory by using Reader / Puncher interface, though the read terminate command is specified, input is not interrupted after 10 characters read. I/O unit or P.C.B. is defective.
088	LAN FILE TRANS ERROR (CHANNEL–1)	File data transfer via OSI–ETHERNET has been stopped due to a transfer error.
089	LAN FILE TRANS ERROR (CHANNEL–2)	File data transfer via OSI–ETHERNET has been stopped due to a transfer error.
090	REFERENCE RETURN INCOMPLETE	1. The reference position return cannot be performed normally because the reference position return start point is too close to the reference position or the speed is too slow. Separate the start point far enough from the reference position, or specify a sufficiently fast speed for reference position return. 2. During reference position return with the absolute–position detector, if this alarm occurs even though condition 1 is satisfied, do the following: After turning the servo motor for the axis at least one turn, turn the power off and then on again. Then perform reference position return.
091	REFERENCE RETURN INCOMPLETE	Manual reference position return cannot be performed when automatic operation is halted.
092	AXES NOT ON THE REFERENCE POINT	The commanded axis by G27 (Reference position return check) did not return to the reference position.
094	P TYPE NOT ALLOWED (COORD CHG)	P type cannot be specified when the program is restarted. (After the automatic operation was interrupted, the coordinate system setting operation was performed.) Perform the correct operation according to th operator's manual.
095	P TYPE NOT ALLOWED (EXT OFS CHG)	P type cannot be specified when the program is restarted. (After the automatic operation was interrupted, the external workpiece offset amount changed.) Perform the correct operation according to th operator's manual.
096	P TYPE NOT ALLOWED (WRK OFS CHG)	P type cannot be specified when the program is restarted. (After the automatic operation was interrupted, the workpiece offset amount changed.) Perform the correct operation according to the operator's manual.
097	P TYPE NOT ALLOWED (AUTO EXEC)	P type cannot be directed when the program is restarted. (After power ON, after emergency stop or P / S 94 to 97 reset, no automatic operation is performed.) Perform automatic operation.
098	G28 FOUND IN SEQUENCE RETURN	A command of the program restart was specified without the reference position return operation after power ON or emergency stop, and G28 was found during search. Perform the reference position return.
099	MDI EXEC NOT ALLOWED AFT. SEARCH	After completion of search in program restart, a move command is given with MDI. Move axis before a move command or don't interrupt MDI operation.
100	PARAMETER WRITE ENABLE	The parameter write enable field on the SETTING display is set to "1" to enable the writing of parameters. Change the field to "0". Press the MAINT., CNC maintenance, CNC setup, and PS100 alarm deletion buttons to clear the PS100 alarm.

Number	Message	Contents
101	PLEASE CLEAR MEMORY	The alarm can be reset by pressing the Fanuc CNC display functions Option, Delete Alarm, and PS101. This procedure deletes only the program being edited. Register the deleted program again.
109	FORMAT ERROR IN G08	A value other than 0 or 1 was specified after P in the G08 code, or no value was specified.
110	DATA OVERFLOW	The absolute value of fixed decimal point display data exceeds the allowable range. Modify the program.
111	CALCULATED DATA OVERFLOW	The result of calculation turns out to be invalid, an alarm No.111 is issued. -10^{47} to -10^{-29}, 0, 10^{-29} to 10^{47} Modify the program.
112	DIVIDED BY ZERO	Division by zero was specified. (including tan 90°) Modify the program.
113	IMPROPER COMMAND	A function which cannot be used in custom macro is commanded. Modify the program.
114	FORMAT ERROR IN MACRO	There is an error in other formats than <Formula>. Modify the program.
115	ILLEGAL VARIABLE NUMBER	A value not defined as a variable number is designated in the custom macro or in high–speed cycle machining. The header contents are improper. This alarm is given in the following cases: High speed cycle machining 1. The header corresponding to the specified machining cycle number called is not found. 2. The cycle connection data value is out of the allowable range (0 – 999). 3. The number of data in the header is out of the allowable range (0 – 32767). 4. The start data variable number of executable format data is out of the allowable range (#20000 – #85535). 5. The last storing data variable number of executable format data is out of the allowable range (#85535). 6. The storing start data variable number of executable format data is overlapped with the variable number used in the header. Modify the program.
116	WRITE PROTECTED VARIABLE	The left side of substitution statement is a variable whose substitution is inhibited. Modify the program.
118	PARENTHESIS NESTING ERROR	The nesting of bracket exceeds the upper limit (quintuple). Modify the program.
119	ILLEGAL ARGUMENT	The SQRT argument is negative. Or BCD argument is negative, and other values than 0 to 9 are present on each line of BIN argument. Modify the program.
122	FOUR FOLD MACRO MODAL–CALL	The macro modal call is specified four fold. Modify the program.
123	CAN NOT USE MACRO COMMAND IN DNC	Macro control command is used during DNC operation. Modify the program.
124	MISSING END STATEMENT	DO – END does not correspond to 1 : 1. Modify the program.
125	FORMAT ERROR IN MACRO	<Formula> format is erroneous. Modify the program.
126	ILLEGAL LOOP NUMBER	In DOn, $1 \leq n \leq 3$ is not established. Modify the program.

Number	Message	Contents
127	NC, MACRO STATEMENT IN SAME BLOCK	NC and custom macro commands coexist. Modify the program.
128	ILLEGAL MACRO SEQUENCE NUMBER	The sequence number specified in the branch command was not 0 to 9999. Or, it cannot be searched. Modify the program.
129	ILLEGAL ARGUMENT ADDRESS	An address which is not allowed in <Argument Designation > is used. Modify the program.
130	ILLEGAL AXIS OPERATION	An axis control command was given by PMC to an axis controlled by CNC. Or an axis control command was given by CNC to an axis controlled by PMC. Modify the program.
131	TOO MANY EXTERNAL ALARM MESSAGES	Five or more alarms have generated in external alarm message. Consult the PMC ladder diagram to find the cause.
132	ALARM NUMBER NOT FOUND	No alarm No. concerned exists in external alarm message clear. Check the PMC ladder diagram.
133	ILLEGAL DATA IN EXT. ALARM MSG	Small section data is erroneous in external alarm message or external operator message. Check the PMC ladder diagram.
135	ILLEGAL ANGLE COMMAND (M series)	The index table indexing positioning angle was instructed in other than an integral multiple of the value of the minimum angle. Modify the program.
	SPINDLE ORIENTATION PLEASE (T series)	Without any spindle orientation , an attept was made for spindle indexing. Perform spindle orientation.
136	ILLEGAL AXIS COMMAND (M series)	In index table indexing.Another control axis was instructed together with the B axis. Modify the program.
	C/H–CODE & MOVE CMD IN SAME BLK. (T series)	A move command of other axes was specified to the same block as spindle indexing addresses C, H. Modify the program.
137	M–CODE & MOVE CMD IN SAME BLK.	A move command of other axes was specified to the same block as M–code related to spindle indexing. Modify the program.
138	SUPERIMPOSED DATA OVER-FLOW	The total distribution amount of the CNC and PMC is too large during superimposed control of the extended functions for PMC axis control.
139	CAN NOT CHANGE PMC CONTROL AXIS	An axis is selected in commanding by PMC axis control. Modify the program.
141	CAN NOT COMMAND G51 IN CRC (M series)	G34 (Scaling ON) is commanded in the tool offset mode. Modify the program.
142	ILLEGAL SCALE RATE (M series)	Scaling magnification is commanded in other than 1 – 999999. Correct the scaling magnification setting (G34 P_p .... or parameter 5411 or 5421).
143	SCALED MOTION DATA OVER-FLOW (M series)	The scaling results, move distance, coordinate value and circular radius exceed the maximum command value. Correct the program or scaling mangification.
144	ILLEGAL PLANE SELECTED (M series)	The coordinate rotation plane and arc or cutter compensation C plane must be the same. Modify the program.
145	ILLEGAL CONDITIONS IN POLAR COORDINATE INTERPOLATION	The conditions are incorrect when the polar coordinate interpolation starts or it is canceled. 1) In modes other than G40, G12.1/G13.1 was specified. 2) An error is found in the plane selection. Parameters No. 5460 and No. 5461 are incorrectly specified. Modify the value of program or parameter.
146	IMPROPER G CODE	G codes which cannot be specified in the polar coordinate interpolation mode was specified. See section II–4.4 and modify the program.
148	ILLEGAL SETTING DATA (M series)	Automatic corner override deceleration rate is out of the settable range of judgement angle. Modify the parameters (No.1710 to No.1714)

Number	Message	Contents
149	FORMAT ERROR IN G10L3	A code other than Q1,Q2,P1 or P2 was specified as the life count type in the extended tool life management.
150	ILLEGAL TOOL GROUP NUMBER	Tool Group No. exceeds the maximum allowable value. Modify the program.
151	TOOL GROUP NUMBER NOT FOUND	The tool group commanded in the machining program is not set. Modify the value of program or parameter.
152	NO SPACE FOR TOOL ENTRY	The number of tools within one group exceeds the maximum value registerable. Modify the number of tools.
153	T–CODE NOT FOUND	In tool life data registration, a T code was not specified where one should be. Correct the program.
154	NOT USING TOOL IN LIFE GROUP (M series)	When the group is not commanded, H99 or D99 was commanded. Correct the program.
155	ILLEGAL T–CODE IN M06 (M series)	In the machining program, M06 and T code in the same block do not correspond to the group in use. Correct the program.
	ILLEGAL T–CODE IN M06 (T series)	Group No.$\Delta\Delta$ which is specified with T$\Delta\Delta$ 88 of the machining program do not included in the tool group in use. Correct the program.
156	P/L COMMAND NOT FOUND	P and L commands are missing at the head of program in which the tool group is set. Correct the program.
157	TOO MANY TOOL GROUPS	The number of tool groups to be set exceeds the maximum allowable value. (See parameter No. 6800 bit 0 and 1) Modify the program.
158	ILLEGAL TOOL LIFE DATA	The tool life to be set is too excessive. Modify the setting value.
159	TOOL DATA SETTING INCOMPLETE	During executing a life data setting program, power was turned off. Set again.
160	MISMATCH WAITING M–CODE (T series (At two–path))	Diffrent M code is commanded in heads 1 and 2 as waiting M code. Modify the program.
	MISMATCH WAITING M–CODE (T series (At three–path))	1) Although the same P command is specified, the waiting M codes do not match. 2) Although the waiting M codes match, the P commands do not match. 3) Two–path wait and three–path wait are specified simultaneously. Modify the program.
	G72.1 NESTING ERROR (M series)	A subprogram which performs rotational copy with G72.1 contains another G72.1 command.
161	ILLEGAL P OF WAITING M–CODE (T series (three–path control))	1) The value of address P is a negative value, 1, 2, 4, or a value not smaller than 8. 2) The value specified in P is not consistent with the system configuration. Modify the program.
	G72.1 NESTING ERROR (M series)	A subprogram which performs parallel copy with G72.2 contains another G72.2 command.
163	COMMAND G68/G69 INDEPENDENTLY (T series (At two–path))	G68 and G69 are not independently commanded in balance cut. Modify the program.
169	ILLEGAL TOOL GEOMETRY DATA (At two–path)	Incorrect tool figure data in interference check. Set correct data, or select correct tool figure data.
175	ILLEGAL G107 COMMAND	Conditions when performing circular interpolation start or cancel not correct. To change the mode to the cylindrical interpolation mode, specify the command in a format of "G07.1 rotation–axis name radius of cylinder."

Number	Message	Contents
176	IMPROPER G–CODE IN G107 (M series)	Any of the following G codes which cannot be specified in the cylindrical interpolation mode was specified. 1) G codes for positioning: G28,, G73, G74, G76, G81 – G89, including the codes specifying the rapid traverse cycle 2) G codes for setting a coordinate system: G52,G92, 3) G code for selecting coordinate system: G53 G54–G59 Modify the program.
	IMPROPER G–CODE IN G107 (T series)	Any of the following G codes which cannot be specified in the cylindrical interpolation mode was specified. 1) G codes for positioning: G28, G76, G81 – G89, including the codes specifying the rapid traverse cycle 2) G codes for setting a coordinate system: G50, G52 3) G code for selecting coordinate system: G53 G54–G59 Modify the program.
177	CHECK SUM ERROR (G05 MODE)	Check sum error Modify the program.
178	G05 COMMANDED IN G41/G42 MODE	G05 was commanded in the G41/G42 mode. Correct the program.
179	PARAM. (NO. 7510) SETTING ERROR	The number of controlled axes set by the parameter 7510 exceeds the maximum number. Modify the parameter setting value.
180	COMMUNICATION ERROR (REMOTE BUF)	Remote buffer connection alarm has generated. Confirm the number of cables, parameters and I/O device.
181	FORMAT ERROR IN G81 BLOCK (Hobbing machine, EGB) (M series)	G81 block format error (hobbing machine) 1) T (number of teeth) has not been instructed. 2) Data outside the command range was instructed by either T, L, Q or P. 3) An overflow occurred in synchronization coefficient calculation. Modify the program.
182	G81 NOT COMMANDED (Hobbing machine) (M series)	G83 (C axis servo lag quantity offset) was instructed though synchronization by G81 has not been instructed. Correct the program. (hobbing machine)
183	DUPLICATE G83 (COMMANDS) (Hobbing machine) (M series)	G83 was instructed before canceled by G82 after compensating for the C axis servo lag quantity by G83. (hobbing machine)
184	ILLEGAL COMMAND IN G81 (Hobbing machine, EGB) (M series)	A command not to be instructed during synchronization by G81 was instructed. (hobbing machine) 1) A C axis command by G00, G27, G28, G29, G30, etc. was instructed. 2) Inch/Metric switching by G20, G21 was instructed.
185	RETURN TO REFERENCE POINT (Hobbing machine) (M series)	G81 was instructed without performing reference position return after power on or emergency stop. (hobbing machine) Perform reference position return.
186	PARAMETER SETTING ERROR (Hobbing machine, EGB) (M series)	Parameter error regarding G81 (hobbing machine) 1) The C axis has not been set to be a rotary axis. 2) A hob axis and position coder gear ratio setting error Modify the parameter.
187	HOB COMMAND IS NOT ALLOWED	Error in the modal state when G81.4 or G81 is specified 1. The canned cycle mode (G81 to G89) is set. 2. The thread cutting mode is set. 3. The C–axis is under synchronous, composite, or superimposed control.

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Number	Message	Contents
190	ILLEGAL AXIS SELECT	In the constant surface speed control, the axis specification is wrong. (See parameter No. 3770.) The specified axis command (P) contains an illegal value. Correct the program.
194	SPINDLE COMMAND IN SYNCHRO–MODE	A contour control mode, spindle positioning (Cs–axis control) mode, or rigid tapping mode was specified during the serial spindle synchronous control mode. Correct the program so that the serial spindle synchronous control mode is released in advance.
197	C–AXIS COMMANDED IN SPINDLE MODE	The program specified a movement along the Cs–axis when the signal CON(DGN=G027#7) was off. Correct the program, or consult the PMC ladder diagram to find the reason the signal is not turned on.
199	MACRO WORD UNDEFINED	Undefined macro word was used. Modify the custom macro.
200	ILLEGAL S CODE COMMAND	In the rigid tap, an S value is out of the range or is not specified. Modify the program.
201	FEEDRATE NOT FOUND IN RIGID TAP	In the rigid tap, no F value is specified. Correct the program.
202	POSITION LSI OVERFLOW	In the rigid tap, spindle distribution value is too large. (System error)
203	PROGRAM MISS AT RIGID TAPPING	In the rigid tap, position for a rigid M code (M29) or an S command is incorrect. Modify the program.
204	ILLEGAL AXIS OPERATION	In the rigid tap, an axis movement is specified between the rigid M code (M29) block and G84 or G74 for M series (G84 or G88 for T series) block. Modify the program.
205	RIGID MODE DI SIGNAL OFF	1. Although a rigid M code (M29) is specified in rigid tapping, the rigid mode DI signal (DGN G061.0) is not ON during execution of the G84 (G88) block. 2. In a system with the multi–spindle option, the spindle used for rigid tapping is not selected (by DI signal G27#0 and #1, or G61#4 and #5). Check the PMC ladder diagram to find the reason why the DI signal is not turned on.
206	CAN NOT CHANGE PLANE (M series)	Plane changeover was instructed in the rigid mode. Correct the program.
207	RIGID DATA MISMATCH	The specified distance was too short or too long in rigid tapping.
210	CAN NOT COMAND M198/M199	M98 and M99 are executed in the schedule operation. M198 is executed in the DNC operation. Modify the program. 1) The execution of an M198 or M99 command was attempted during scheduled operation. Alternatively, the execution of an M198 command was attempted during DNC operation. Correct the program. The execution of an M99 command was attempted by an interrupt macro during pocket machining in a multiple repetitive canned cycle.
211	G31 (HIGH) NOT ALLOWED IN G99 (T series)	G31 is commanded in the per revolution command when the high–speed skip option is provided. Modify the program.
212	ILLEGAL PLANE SELECT (M series)	The arbitrary angle chamfering or a corner R is commanded or the plane including an additional axis. Correct the program.
	ILLEGAL PLANE SELECT (T series)	The direct drawing dimensions programming is commanded for the plane other than the Z–X plane. Correct the program.

Number	Message	Contents
213	ILLEGAL COMMAND IN SYNCHRO–MODE (M series)	Movement is commanded for the axis to be synchronously controlled. Any of the following alarms occurred in the operation with the simple synchronization control. 1) The program issued the move command to the slave axis. 2) The program issued the manual continuous feed/manual handle feed/incremental feed command to the slave axis. 3) The program issued the automatic reference position return command without specifying the manual reference position return after the power was turned on. 4) The difference between the position error amount of the master and slave axes exceeded the value specified in parameter NO.8313.
	ILLEGAL COMMAND IN SYNCHRO–MODE (T series)	A move command has been specified for an axis subject to synchronous control.
214	ILLEGAL COMMAND IN SYNCHRO–MODE	Coordinate system is set or tool compensation of the shift type is executed in the synchronous control. Correct the program.
217	DUPLICATE G51.2 (COMMANDS) (T series)	G51.2/G251 is further commanded in the G51.2/G251 mode. Modify the program.
218	NOT FOUND P/Q COMMAND IN G251 (T series)	P or Q is not commanded in the G251 block, or the command value is out of the range. Modify the program.
219	COMMAND G250/G251 INDEPENDENTLY (T series)	G251 and G250 are not independent blocks.
220	ILLEGAL COMMAND IN SYNCHR–MODE (T series)	In the synchronous operation, movement is commanded by the NC program or PMC axis control interface for the synchronous axis.
221	ILLEGAL COMMAND IN SYNCHR–MODE (T series)	Polygon machining synchronous operation and axis control or balance cutting are executed at a time. Modify the program.
222	DNC OP. NOT ALLOWED IN BG.–EDIT (M series)	Input and output are executed at a time in the background edition. Execute a correct operation.
224	RETURN TO REFERENCE POINT (M series)	Reference position return has not been performed before the automatic operation starts. Perform reference position return only when bit 0 of parameter 1005 is 0.
	TURN TO REFERENCE POINT (T series)	Reference position return is necessary before cycle start.
225	SYNCHRONOUS/MIXED CONTROL ERROR (T series (At two–path))	This alarm is generated in the following circumstances. (Searched for during synchronous and mixed control command. 1 When there is a mistake in axis number parameter (No. 1023) setting. 2 When there is a mistake in control commanded. During hobbing synchronization, a command to bring the C–axis under synchronous, composite, or superimposed control is made. Modify the program or the parameter.
226	ILLEGAL COMMAND IN SYNCHRO–MODE (T series (At two–path))	A travel command has been sent to the axis being synchronized in synchronous mode. Modify the program or the parameter.
229	CAN NOT KEEP SYNCHRO–STATE (T series)	This alarm is generated in the following circumstances. 1 When the synchro/mixed state could not be kept due to system overload. 2 The above condition occurred in CMC devices (hardware) and synchro–state could not be kept. (This alarm is not generated in normal use conditions.)
230	R CODE NOT FOUND (Grinding machine) (M series)	The infeed quantity R has not been instructed for the G161 block. Or the R command value is negative. Correct the program.

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Number	Message	Contents
231	ILLEGAL FORMAT IN G10 OR L50	Any of the following errors occurred in the specified format at the pro-grammable–parameter input (G30). 1 Address N or R was not entered. 2 A number not specified for a parameter was entered. 3 The axis number was too large. 4 An axis number was not specified in the axis–type parameter. 5 An axis number was specified in the parameter which is not an axis type. Correct the program. 6 In the locked state set by the password function, an attempt was made to set bit 4 (NE9) of parameter No. 3204 to 0 or change the contents of parameter No. 3210. 7 An attempt was made to change a program encryption parameter (parameter No. 3220 to 3223).
232	TOO MANY HELICAL AXIS COMMANDS	Three or more axes (in the normal direction control mode (M series) two or more axes) were specified as helical axes in the helical interpolation mode.
233	DEVICE BUSY	When an attempt was made to use a unit such as that connected via the RS–232–C interface, other users were using it.
239	BP/S ALARM	While punching was being performed with the function for controlling external I/O units ,background editing was performed.
240	BP/S ALARM	Background editing was performed during MDI operation.
241	ILLEGAL FORMAT IN G02.2/G03.2 (M series)	The end point, I, J, K, or R is missing from a command for involute interpolation.
242	ILLEGAL COMMAND IN G02.2/G03.2 (M series)	An invalid value has been specified for involute interpolation. • The start or end point is within the basic circle. • I, J, K, or R is set to 0. • The number of rotations between the start of the involute curve and the start or end point exceeds 100.
243	OVER TOLERANCE OF END POINT (M series)	The end point is not on the involute curve which includes the start point and thus falls outside the range specified with parameter No. 5610.
244	P/S ALARM (T series)	In the skip function activated by the torque limit signal, the number of accumulated erroneous pulses exceed 32767 before the signal was input. Therefore, the pulses cannot be corrected with one distribution. Change the conditions, such as feed rates along axes and torque limit, and try again.
245	T–CODE NOT ALOWEE IN THIS BLOCK (T series)	One of the G codes, G50, G10, and G04, which cannot be specified in the same block as a T code, was specified with a T code.
246	ENCODE PROGRAM NUMBER ERROR	During read of an encrypted program, an attempt was made to store the program with a number exceeding the protection range. (See parameter Nos. 3222 and 223.)
247	ILLEGAL CODE USED FOR OUTPUT	When an encrypted program is output, EIA is set for the punch code. Specify ISO.
250	Z AXIS WRONG COMMAND (ATC) (M series)	Movement along the Z–axis is specified in a block specifying a tool change command (M06T_). (Only for ROBODRILL)

Number	Message	Contents
251	ATC ERROR (M series)	This alarm is issued in the following cases: • An M06T_ command contains an unusable T code. • An M06 command has been specified when the Z machine coordi nate is positive. • The parameter for the current tool number (No. 7810) is set to 0. • An M06 command has been specified in canned cycle mode. • A reference position return command (G27 to G44) and M06 command have been specified in the same block. • An M06 command has been specified in tool compensation mode (G41 to G44). • An M06 command has been specified without performing reference position return after power–on or the release of emergency stop. • The machine lock signal or Z–axis ignore signal has been turned on during tool exchange. • A pry alarm has been detected during tool exchange. Refer to diagnosis No. 530 to determine the cause. (Only for ROBO-DRILL)
252	ATC SPINDLE ALARM (M series)	An excessive error arose during spindle positioning for ATC. For details, refer to diagnosis No. 531. (Only for ROBODRILL)
253	G05 IS NOT AVAILABLE (M series)	Alarm details Binary input operation using high–speed remote buffer (G05) or high–speed cycle machining (G05) has been specified in advance control mode (G08P1). Execute G08P0; to cancel advance control mode, before executing these G05 commands.
4500	REPOSITIONING INHIBITED	A repositioning command was specified in the circular interpolation (G02, G03) mode.
4502	ILLEGAL COMMAND IN BOLT HOLE	In a bolt hole circle (G26) command, the radius (I) was set to zero or a negative value, or the number of holes (K) was set to zero. Alternatively, I, J, or K was not specified.
4503	ILLEGAL COMMAND IN LINE AT ANGLE	In a line-at-angle (G28) command, the number of holes (K) was set to zero or a negative value. Alternatively, I, J, or K was not specified.
4504	ILLEGAL COMMAND IN ARC	In an arc (G29) command, the radius (I) or the number of holes (K) was set to zero or a negative value. Alternatively, I, J, K, or P was not specified.
4505	ILLEGAL COMMAND IN GRID	In a grid (G36, G37) command, the number of holes (P, K) was set to zero or a negative value. Alternatively, I, J, K, or P was not specified.
4506	ILLEGAL COMMAND IN SHARE PROOFS	In a shear proof (G66) command, the tool size (P) was set to zero, or the blanking length (I) was 1.5 times larger than the tool size (P) or less. Alternatively, I, J, or P was not specified.
4507	ILLEGAL COMMAND IN SQUARE	In a square (G67) command, the tool size (P,Q) was set to zero or a negative value, or the blanking length (I, J) was three times larger than the tool size (P, Q) or less. Alternatively, I, J, P, or Q was not specified.
4508	ILLEGAL COMMAND IN RADIUS	In a radius (G78) command, the traveling pitch (Q) or radius (I) was set to zero or a negative value, or the traveling pitch (Q) was greater than or equal to the arc length. Alternatively, I, J, K, P, or Q was not specified.
4509	ILLEGAL COMMAND IN CUT AT ANGLE	In a cut-at-angle (G79) command, the traveling pitch (Q) was set to zero, negative value, or another value larger than or equal to the length (I). Alternatively, I, J, P, or Q was not specified.
4510	ILLEGAL COMMAND IN LINE-PUNCH	In a linear punching (G45) command, the traveling distance was set to zero or a value 1.5 times larger than the tool size (P) or less. Alternatively, P was not specified.

Number	Message	Contents
4511	ILLEGAL COMMAND IN CIRCLE-PUNCH	In a circular punching (G46, G47) command, the same position was specified for both start and end points of the arc, radius (R) of the arc was set to zero, or the pitch (Q) was set to a value exceeding the arc length. Alternatively, R or Q was not specified.
4520	T, M INHIBITED IN NIBBLING-MODE	T code, M code, G04, G70 or G27 (G25) was specified in the nibbling mode.
4521	EXCESS NIBBLING MOVEMENT (X, Y)	In the nibbling mode, the X-axis or Y-axis traveling distance was larger than or equal to the limit (No. 16188 to 16193).
4522	EXCESS NIBBLING MOVEMENT (C)	In the circular nibbling (G68) or usual nibbling mode, the C-axis traveling distance was larger than or equal to the limit (No. 16194).
4523	ILLEGAL COMMAND IN CIRCLE-NIBBL	In a circular nibbling (G68) command, the traveling pitch (Q) was set to zero, a negative value, or a value larger than or equal to the limit (No. 16186, 16187), or the radius (I) was set to zero or a negative value. Alternatively, I, J, K, P, or Q was not specified.
4524	ILLEGAL COMMAND IN LINE-NIBBL	In a linear nibbling (G69) command, the traveling pitch (Q) was set to zero, negative value, or a value larger than or equal to the limit (No. 16186, 16187). Alternatively, I, J, P, or Q was not specified.
4530	A/B MACRO NUMBER ERROR	The number for storing and calling by an A or B macro was set to a value beyond the range from 1 to 5.
4531	U/V MACRO FORMAT ERROR	An attempt was made to store a macro while storing another macro using a U or V macro. A V macro was specified although the processing to store a macro was not in progress. A U macro number and V macro number do not correspond with each other.
4532	IMPROPER U/V MACRO NUMBER	The number of an inhibited macro (number beyond the range from 01 to 99) was specified in a U or V macro command.
4533	U/V MACRO MEMORY OVERFLOW	An attempt was made to store too many macros with a U or V macro command.
4534	W MACRO NUMBER NOT FOUND	Macro number W specified in a U or V macro command is not stored.
4535	U/V MACRO NESTING ERROR	An attempt was made to call a macro which is defined three times or more using a U or V macro command. An attempt was made to store 15 or more macros in the storage area for macros of number 90 to 99.
4536	NO W, Q COMMAND IN MULTI-PIECE	W or Q was not specified in the command for taking multiple workpieces (G75, G76).
4537	ILLEGAL Q VALUE IN MULTI-PIECE	In the command for taking multiple workpieces (G75, G76), Q is set to a value beyond the range from 1 to 4.
4538	W NO. NOT FOUND IN MULTI-PIECE	Macro number W specified in the command for taking multiple workpieces (G75, G76) is not stored.
4539	MULTI-PIECE SETTING IS ZERO	The command for taking multiple workpieces (G75, G76) was specified although zero is specified for the function to take multiple workpieces (No. 16206 or signals MLP1 and MLP2 (PMC address G231, #0 and #1)).
4540	MULTI-PIECE COMMAND WITHIN MACRO	The command for taking multiple workpieces (G75, G76) was specified when a U or V macro was being stored.
4542	MULTI-PIECE COMMAND ERROR	Although G98P0 was specified, the G75 command was issued. Although G98K0 was specified, the G76 command was issued.

Number	Message	Contents
4543	MULTI-PIECE Q COMMAND ERROR	Although G98P0 was specified, the Q value for the G76 command was not 1 or 3. Although G98K0 was specified, the Q value for the G75 command was not 1 or 2.
4544	MULTI-PIECE RESTART ERROR	In the command for resuming taking multiple workpieces, the resume position (P) is set to a value beyond the range from 1 to total number of workpieces to be machined.
4549	ILLEGAL TOOL DATA FORMAT	The quantity of tool data patterns to be saved is too large to fit the usable area (16 KB).
4600	T, C COMMAND IN INTERPOLATION	In the linear interpolation (G01) mode or circular interpolation (G02, G03) mode, a T command or C-axis command was specified.
4601	INHIBITED T, M COMMAND	In the block of G75, G76, G93, or G98, a T or M command was specified.
4602	ILLEGAL T-CODE	The specified T command is not cataloged on the tool register screen.
4603	C AXIS SYNCHRONOUS ERROR	The difference between the position deviation value of C1 axis and C2 axis exceeds the parameter value (No. 16364, 16365) with the C–axis synchronous control function.
4604	ILLEGAL AXIS OPERATION	A C-axis command was specified in the block containing a T command for multiple tools.
4605	NEED ZRN	C–axis synchronization failed.
4630	ILLEGAL COMMAND IN LASER MODE	In the laser mode, a nibbling command or pattern command was specified. In the tracing mode, an attempt was made to make a switch to the punching mode.
4650	IMPROPER G-CODE IN OFFSET MODE	In the cutter compensation mode, an inhibited G code (pattern command, G75, G76, G27, etc.) was specified.
4700	PROGRAM ERROR (OT +)	The value specified in the X-axis move command exceeded the positive value of stored stroke limit 1. (Advance check)
4701	PROGRAM ERROR (OT –)	The value specified in the X-axis move command exceeded the negative value of stored stroke limit 1. (Advance check)
4702	PROGRAM ERROR (OT +)	The value specified in the Y-axis move command exceeded the positive value of stored stroke limit 1. (Advance check)
4703	PROGRAM ERROR (OT –)	The value specified in the Y-axis move command exceeded the negative value of stored stroke limit 1. (Advance check)
4704	PROGRAM ERROR (OT +)	The value specified in the Z-axis move command exceeded the positive value of stored stroke limit 1. (Advance check)
4705	PROGRAM ERROR (OT –)	The value specified in the Z-axis move command exceeded the negative value of stored stroke limit 1. (Advance check)
5000	ILLEGAL COMMAND CODE (M series)	The specified code was incorrect in the high–precision contour control (HPCC) mode.
5003	ILLEGAL PARAMETER (HPCC) (M series)	There is an invalid parameter.
5004	HPCC NOT READY (M series)	High–precision contour control is not ready.
5006	TOO MANY WORD IN ONE BLOCK (M series)	The number of words specified in a block exceeded 26 in the HPCC mode.
5007	TOO LARGE DISTANCE (M series)	In the HPCC mode, the machine moved beyond the limit.
5009	PARAMETER ZERO (DRY RUN) (M series)	The maximum feedrate (parameter No. 1422) or the feedrate in dry run (parameter No. 1410) is 0 in the HPCC model.
5010	END OF RECORD	The end of record (%) was specified. I/O is incorrect. modify the program.

Number	Message	Contents
5011	PARAMETER ZERO(CUT MAX) (M series)	The maximum cutting feedrate (parameter No. 1422, No. 1430, No. 1431, No. 1432) is 0 in the HPCC mode.
5012	G05 P10000 ILLEGAL START UP (HPCC) (M series)	Function category: High–precision contour control Alarm details: G05 P10000 has been specified in a mode from which the system cannot enter HPCC mode.
5013	HPCC: CRC OFS REMAIN AT CANCEL (M series)	G05P0 has been specified in G41/G42 mode or with offset remaining.
5014	TRACE DATA NOT FOUND	Transfer cannot be performed because no trace data exists.
5015	NO ROTATION AXIS (M series)	The specified rotation axis does not exist for tool axis direction handle feed.
5016	ILLEGAL COMBINATION OF M CODE	M codes which belonged to the same group were specified in a block. Alternatively,an M code which must be specified without other M codes in the block was specified in a block with other M codes.
5018	POLYGON SPINDLE SPEED ERROR (T series)	Function category: Polygon turning Alarm details: In G51.2 mode, the speed of the spindle or polygon synchronous axis either exceeds the clamp value or is too small. The specified rotation speed ratio thus cannot be maintained.
5020	PARAMETER OF RESTART ERROR	An erroneous parameter was specified for restarting a program. A parameter for program restart is invalid.
5030	ILLEGAL COMMAND (G100) (T series)	The end command (G110) was specified before the registratioin start command (G101, G102, or G103) was specified for the B–axis.
5031	ILLEGAL COMMAND (G100, G102, G103) (T series)	While a registration start command (G101, G102, or G103) was being executed, another registration start command was specified for the B–axis.
5032	NEW PRG REGISTERED IN B–AXS MOVE (T series)	While the machine was moving about the B–axis, at attempt was made to register another move command.
5033	NO PROG SPACE IN MEMORY B–AXS (T series)	Commands for movement about the B–axis were not registered because of insufficient program memory.
5034	PLURAL COMMAND IN G110 (T series)	Multiple movements were specified with the G110 code for the B–axis.
5035	NO FEEDRATE COMMANDED B–AXS (T series)	A feedrate was not specified for cutting feed about the B–axis.
5036	ADDRESS R NOT DEFINED IN G81–G86 (T series)	Point R was not specified for the canned cycle for the B–axis.
5037	ADDRESS Q NOT DEFINED IN G83 (T series)	Depth of cut Q was not specified for the G83 code (peck drilling cycle). Alternatively, 0 was specified in Q for the B–axis.
5038	TOO MANY START M–CODE COMMAND (T series)	More than six M codes for starting movement about the B–axis were specified.
5039	START UNREGISTERED B–AXS PROG (T series)	An attempt was made to execute a program for the B–axis which had not been registered.
5040	CAN NOT COMMANDED B–AXS MOVE (T series)	The machine could not move about the B–axis because parameter No.8250 was incorrectly specified, or because the PMC axis system could not be used.
5041	CAN NOT COMMANDED G110 BLOCK (T series)	Blocks containing the G110 codes were successively specified in tool–tip radius compensation for the B–axis.

Number	Message	Contents
5043	TOO MANY G68 NESTING (M series)	Three–dimensional coordinate conversion G68 has been specified three or more times.
	TOO MANY G68 NESTING (T series)	Three–dimensional coordinate conversion G68.1 has been specified three or more times.
5044	G68 FORMAT ERROR (M series)	A G68 command block contains a format error. This alarm is issued in the following cases: 1. I, J, or K is missing from a G68 command block (missing coordinate rotation option). 2. I, J, and K are 0 in a G68 command block. 3. R is missing from a G68 command block.
	G68 FORMAT ERROR (T series)	A G68.1 command block contains a format error. This alarm is issued in the following cases: 1. I, J, or K is missing from a G68.1 command block (missing coordinate rotation option). 2. I, J, and K are 0 in a G68.1 command block. 3. R is missing from a G68.1 command block.
5046	ILLEGAL PARAMETER (ST.COMP)	The parameter settings for straightness compensation contain an error. Possible causes are as follows: 1. A parameter for a movement axis or compensation axis contains an axis number which is not used. 2. More than 128 pitch error compensation points exist between the negative and positive end points. 3. Compensation point numbers for straightness compensation are not assigned in the correct order. 4. No straightness compensation point exists between the pitch error compensation points at the negative and positive ends. 5. The compensation value for each compensation point is too large or too small. 6 The settings of parameters Nos. 13881 to 13886 are illegal (in the interpolation type straightness compensation).
5050	ILL–COMMAND IN CHOPPING MODE (M series)	A command for switching the major axis has been specified for circular threading. Alternatively, a command for setting the length of the major axis to 0 has been specified for circular threading.
5051	M–NET CODE ERROR	Abnormal character received (other than code used for transmission)
5052	M–NET ETX ERROR	Abnormal ETX code
5053	M–NET CONNECT ERROR	Connection time monitoring error (parameter No. 175)
5054	M–NET RECEIVE ERROR	Polling time monitoring error (parameter No. 176)
5055	M–NET PRT/FRT ERROR	Vertical parity or framing error
5057	M–NET BOARD SYSTEM DOWN	Transmission timeout error (parameter No. 177) ROM parity error CPU interrupt other than the above
5058	G35/G36 FORMAT ERROR (T series)	A command for switching the major axis has been specified for circular threading. Alternatively, a command for setting the length of the major axis to 0 has been specified for circular threading.
5059	RADIUS IS OUT OF RANGE	A radius exceeding nine digits has been specified for circular interpolation with the center of the arc specified with I, J, and K.

Number	Message	Contents
5060	ILLEGAL PARAMETER IN G02.3/G03.3 (M series)	There is a parameter setting error. Parameter No. 5641 (setting of the linear axis) is not set. The axis set in parameter No. 5641 is not a linear axis. Parameter No. 5642 (setting of a rotation axis) is not set. The axis set in parameter No. 5642 is not a rotation axis. The linear and rotation axes cannot be controlled by the CNC. (The value set in parameter No. 1010 is exceeded.)
5061	ILLEGAL FORMAT IN G02.3/G03.3 (M series)	The exponential interpolation command (G02.3/G03.3) has a format error. Address I, J, or K is not specified. The value of address I, J, or K is 0.
5062	ILLEGAL COMMAND IN G02.3/G03.3	The value specified in an exponential interpolation command (G02.3/03.3) is illegal. A value that does not allow exponential interpolation is specified. (For example, a negative value is specified in In.)
5063	IS NOT PRESET AFTER REF. (M series)	Function category: Workpiece thickness measurement Alarm details The position counter was not preset before the start of workpiece thickness measurement. This alarm is issued in the following cases: (1) An attempt has been made to start measurement without first establishing the origin. (2) An attempt has been made to start measurement without first presetting the position counter after manual return to the origin.
5064	DIFFERRENT AXIS UNIT (IS–B, IS–C) (M series)	Circular interpolation has been specified on a plane consisting of axes having different increment systems.
5065	DIFFERENT AXIS UNIT (PMC AXIS) (M series)	Axes having different increment systems have been specified in the same DI/DO group for PMC axis control. Modify the setting of parameter No. 8010.
5067	G05 PO COMMANDED IN G68/G51 MODE (HPCC) (M series)	HPCC mode cannot be canceled during G51 (scaling) or G68 (coordinate system rotation). Correct the program.
5068	G31 FORMAT ERROR (M series)	The continuous high–speed skip command (G31 P90) has one of the following errors: 1. The axis along which the tool is moved is not specified. 2. More than one axis is specified as the axis along which the tool is moved. Alternatively, the EGB skip command (G31.8) or continuous high–speed skip command (G31.9) has one of the following errors: 1. A move command is specified for the EGB axis (workpiece axis). 2. More than one axis is specified. 3. P is not specified. 4. The specified Q value exceeds the allowable range. Correct the program.
5069	WHL–C:ILLEGA P–DATA (M series)	The P data in selection of the grinding–wheel wear compensation center is illegal.
5073	NO DECIMAL POINT	No decimal point has been specified for an address requiring a decimal point.
5074	ADDRESS DUPLICATION ERROR	The same address has been specified two or more times in a single block. Alternatively, two or more G codes in the same group have been specified in a single block.
5082	DATA SERVER ERROR	This alarm is detailed on the data server message screen.

Number	Message	Contents
5085	SMOOTH IPL ERROR 1	A block for specifying smooth interpolation contains a syntax error.
5096	MISMATCH WAITING M–CODE (M series)	Different wait codes (M codes) were specified in HEAD1 and HEAD2. Correct the program.
5110	NOT STOP POSITION (G05.1 G1) (M series)	An illegal G code was specified in AI contour control mode. A command was specified for the index table indexing axis in AI control mode.
	NOT STOP POSITION (G05.1 G1) (21i–M)	An illegal G code was specified in AI look–ahead control mode. A command was specified for the index table indexing axis in AI look–ahead control mode.
5111	IMPROPER MODEL G–CODE (G05.1 G1) (M series)	An illegal G code is left modal when AI contour control mode was specified.
	IMPROPER MODEL G–CODE (G05.1 G1) (21i–M)	An illegal G code is left modal when AI look–ahead control mode was specified.
5112	G08 CAN NOT BE COMMANDED (G05.1 G1) (M series)	Look–ahead control (G08) was specified in AI contour control mode.
	G08 CAN NOT BE COMMANDED (G05.1 G1) (21i–M)	Look–ahead control (G08) was specified in AI look–ahead control mode.
5114	NOT STOP POSITION (G05.1 Q1) (M series)	At the time of restart after manual intervention, the coordinates at which the manual intervention occurred have not been restored.
	CAN NOT ERROR IN MDI MODE (G05.1) (21i–M)	AI contour control (G05.1) was specified in MDI mode.
5115	SPL : ERROR (M series)	There is an error in the specification of the rank.
		No knot is specified.
		The knot specification has an error.
		The number of axes exceeds the limits.
		Other program errors
5116	SPL : ERROR (M series)	There is a program error in a block under look–ahead control.
		Monotone increasing of knots is not observed.
		In NURBS interpolation mode, a mode that cannot be used together is specified.
5117	SPL : ERROR (M series)	The first control point of NURBS is incorrect.
5118	SPL : ERROR (M series)	After manual intervention with manual absolute mode set to on, NURBS interpolation was restarted.

Number	Message	Contents
5122	ILLEGAL COMMAND IN SPIRAL (M series)	A spiral interpolation or conical interpolation command has an error. Specifically, this error is caused by one of the following: 1) L = 0 is specified. 2) Q = 0 is specified. 3) R/, R/, C is specified. 4) Zero is specified as height increment. 5) Three or more axes are specified as the height axes. 6) A height increment is specified when there are two height axes. 7) Conical interpolation is specified when the helical interpolation function is not selected. 8) Q < 0 is specified when radius difference > 0. 9) Q > 0 is specified when radius difference < 0. 10) A height increment is specified when no height axis is specified.
5123	OVER TOLERANCE OF END POINT (M series)	The difference between a specified end point and the calculated end point exceeds the allowable range (parameter 3471).
5124	CAN NOT COMMAND SPIRAL (M series)	A spiral interpolation or conical interpolation was specified in any of the following modes: 1) Scaling 2) Programmable mirror image 3) Polar coordinate interpolation In cutter compensation C mode, the center is set as the start point or end point.
5134	FSSB : OPEN READY TIME OUT	Initialization did not place FSSB in the open ready state.
5135	FSSB : ERROR MODE	FSSB has entered error mode.
5136	FSSB : NUMBER OF AMPS IS SMALL	In comparison with the number of controlled axes, the number of amplifiers recognized by FSSB is not enough.
5137	FSSB : CONFIGURATION ERROR	FSSB detected a configuration error.
5138	FSSB : AXIS SETTING NOT COMPLETE	In automatic setting mode, axis setting has not been made yet. Perform axis setting on the FSSB setting screen.
5139	FSSB : ERROR	Servo initialization did not terminate normally. The optical cable may be defective, or there may be an error in connection to the amplifier or another module. Check the optical cable and the connection status.
5155	NOT RESTART PROGRAM BY G05	During servo leaning control by G05, an attempt was made to perform restart operation after feed hold or interlock. This restart operation cannot be performed. (G05 leaning control terminates at the same time.)
5156	ILLEGAL AXIS OPERATION (AICC) (M series)	In AI contour control mode, the controlled axis selection signal (PMC axis control) changes. In AI contour control mode, the simple synchonous axis selection signal changes.
	ILLEGAL AXIS OPERATION (AICC) (21i–M)	In AI look–ahead control mode, the controlled axis selection signal (PMC axis control) changes. In AI look–ahead control mode, the simple synchonous axis selection signal changes.
5157	PARAMETER ZERO (AICC) (M series)	Zero is set in the parameter for the maximum cutting feedrate (parameter No. 1422 or 1432). Zero is set in the parameter for the acceleration/deceleration before interpolation (parameter No. 1770 or 1771). Set the parameter correctly.

Number	Message	Contents
5195	DIRECTION CAN NOT BE JUDGED (T series)	When the touch sensor with a single contact signal input is used in the direct input B function for tool offset measurement values, the stored pulse direction is not constant. One of the following conditions exists: · The stop state exists in offset write mode. · Servo off state · The direction varies. · Movement takes place simultaneously along two axes.
5196	ILLEGAL OPERATION (HPCC) (M series)	Detach operation was performed in HPCC mode. (If detach operation is performed in HPCC mode, this alarm is issued after the currently executed block terminates.)
5197	FSSB : OPEN TIME OUT	The CNC permitted FSSB to open, but FSSB was not opened.
5198	FSSB : ID DATA NOT READ	Temporary assignment failed, so amplifier initial ID information could not be read.
5199	FINE TORQUE SENSING PARAMETER	A parameter related to the fine torque sensing function is illegal. · The storage interval is invalid. · An invalid axis number is set as the target axis. Correct the parameter.
5212	SCREEN COPY : PARAMETER ERROR	There is a parameter setting error. Check that 4 is set as the I/O channel.
5213	SCREEN COPY : COMMUNICATION ERROR	The memory card cannot be used. Check the memory card. (Check whether the memory card is write–protected or defective.)
5214	SCREEN COPY : DATA TRANSFER ERROR	Data transfer to the memory card failed. Check whether the memory card space is insufficient and whether the memory card was removed during data transfer.
5218	ILLEGAL PARAMETER (INCL. COMP)	There is an inclination compensation parameter setting error. Cause: 1. The number of pitch error compensation points between the negative (−) end and positive (+) end exceeds 128. 2. The relationship in magnitude among the inclination compensation point numbers is incorrect. 3. An inclination compensation point is not located between the negative (−) end and positive (+) end of the pitch error compensation points. 4. The amount of compensation per compensation point is too large or too small. Correct the parameter.
5219	CAN NOT RETURN	Manual intervention or return is not allowed during three–dimensional coordinate conversion.
5220	REFERENCE POINT ADJUSTMENT MODE	A parameter for automatically set a reference position is set. (Bit 2 of parameter No. 1819 = 1) Perform automatic setting. (Position the machine at the reference position manually, then perform manual reference position return.) Supplementary: Automatic setting sets bit 2 of parameter No. 1819 to 0.
5222	SRAM CORRECTABLE ERROR	The SRAM correctable error cannot be corrected. Cause: A memory problem occurred during memory initialization. Action: Replace the master printed circuit board (SRAM module).

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Number	Message	Contents
5227	FILE NOT FOUND	A specified file is not found during communication with the built–in Handy File.
5228	SAME NAME USED	There are duplicate file names in the built–in Handy File.
5229	WRITE PROTECTED	A floppy disk in the built–in Handy File is write protected.
5231	TOO MANY FILES	The number of files exceeds the limit during communication with the built–in Handy File.
5232	DATA OVER–FLOW	There is not enough floppy disk space in the built–in Handy File.
5235	COMMUNICATION ERROR	A communication error occurred during communication with the built–in Handy File.
5237	READ ERROR	A floppy disk in the built–in Handy File cannot be read from. The floppy disk may be defective, or the head may be dirty. Alternatively, the Handy File is defective.
5238	WRITE ERROR	A floppy disk in the built–in Handy File cannot be written to. The floppy disk may be defective, or the head may be dirty. Alternatively, the Handy File is defective.
5242	ILLEGAL AXIS NUMBER (M series)	The axis number of the synchronous master axis or slave axis is incorrect. (This alarm is issued when flexible synchronization is turned on.) Alternatively, the axis number of the slave axis is smaller than that of the master axis.
5243	DATA OUT OF RANGE (M series)	The gear ratio is not set correctly. (This alarm is issued when flexible synchronization is turned on.)
5244	TOO MANY DI ON (M series)	Even when an M code was encountered in automatic operation mode, the flexible synchronization mode signal was not driven on or off. Check the ladder and M codes.
5245	OTHER AXIS ARE COMMANDED (M series)	One of the following command conditions was present during flexible synchronization or when flexible synchronization was turned on: 1. The synchronous master axis or slave axis is the EGB axis. 2. The synchronous master axis or slave axis is the chopping axis. 3. In reference position return mode
5251	ILLEGAL PARAMETER IN G54.2 (M series)	A fixture offset parameter (No. 7580 to 7588) is illegal. Correct the parameter.
5252	ILLEGAL P COMMAND IN G54.2	The P value specifying the offset number of a fixture offset is too large. Correct the program.
5257	G41/G42 NOT ALLOWED IN MDI MODE (M series)	G41/G42 (cutter compensation C: M series) was specified in MDI mode. (Depending on the setting of bit 4 of parameter No. 5008)
	G41/G42 NOT ALLOWED IN MDI MODE (T series)	G41/G42 (tool–nose radius compensation: T series) was specified in MDI mode. (Depending on the setting of bit 4 of parameter No. 5008)
5258	FEED HOLD IN RESTART	This alarm occurs when resume processing is interrupted by the feed hold function during zero return or program block search. To properly perform resume processing, press the RESET key to clear the alarm, and press the RESUME button again.
5259	INTERRUPTED POSITION NOT FOUND	This alarm occurs when the interrupted position of the program cannot be found. The alarm may be caused because: • The resume program was changed before execution of resume processing. • The program to be executed for the resumption of the processing operation is different from the program executed first (for example, an "if" statement in a macro is rewritten).
5300	SET ALL OFFSET DATAS AGAIN	After the inch/metric automatic conversion function (OIM: Bit 0 of parameter No. 5006) for tool offset data is enabled or disabled, all the tool offset data must be reset. This message reminds the operator to reset the data. If this alarm is issued, reset all the tool offset data. Operating the machine without resetting the data will result in a malfunction.
5302	ILLEGAL COMMAND IN G68 MODE	A command to set the coordinate system is specified in the coordinate system rotation mode.

Number	Message	Contents
5303	TOUCH PANEL ERROR	A touch panel error occurred. Cause: 1. The touch panel is kept pressed. 2. The touch panel was pressed when power was turned on. Remove the above causes, and turn on the power again.
5306	MODE CHANGE ERROR	In a one–touch macro call, mode switching at the time of activation is not performed correctly.
5307	INTERNAL DATA OVER FLOW (M series)	In the following function, internal data exceeds the allowable range. 1) Improvement of the rotation axis feedrate
5311	FSSB:ILLEGAL CONNECTION	A connection related to FSSB is illegal. This alarm is issued when either of the following is found: 1. Two axes having adjacent servo axis numbers (parameter No. 1023), odd number and even number, are assigned to amplifiers to which different FSSB systems are connected. 2. The system does not satisfy the requirements for performing HRV control, and use of two pulse modules connected to different FSSB systems having different FSSB current control cycles is specified.
5321	S–COMP. VALUE OVERFLOW	The straightness compensation value has exceeded the maximum value of 32767.After this alarm is issued, make a manual reference position return.
5400	SPL:ILLEGAL AXIS COMMAND (M series)	An axis specified for spline interpolation or smooth interpolation is incorrect. If an axis that is not the spline axis is specified in spline interpolation mode, this alarm is issued. The spline axis is the axis specified in a block containing G06.1 or the next block. For smooth interpolation, the axis specified in G5.1Q2 is incorrect.
5401	SPL:ILLEGAL COMMAND (M series)	In a G code mode in which specification of G06.1 is not permitted, G06.1 is specified.
5402	SPL:ILLEGAL AXIS MOVING (M series)	A movement is made along an axis that is not the spline interpolation axis. For example, in three–dimensional tool compensation mode using an offset vector of which components are the X–, Y–, and Z–axes, when two–axis spline interpolation is performed with the two spline axes set to the X– and Y–axes, a movement along the Z–axis occurs, resulting in this alarm.
5403	SPL:CAN NOT MAKE VECTOR (M series)	Three–dimensional tool compensation vectors cannot be generated. · When a three–dimensional tool compensation vector is created for the second or subsequent point, that point, previous point, and next point are on the same straight line, and that straight line and the three–dimensional tool compensation vector for the previous point are in parallel. · When a three–dimensional tool compensation vector is created at the end point of smooth interpolation or spline interpolation, the end point and the point two points before are the same.
5405	ILLEGAL PARAMETER IN G41.2/ G42.2 (M series)	The parameter setting that determines the relationship between the rotation axis and rotation plane is incorrect.
5406	G41.3/G40 FORMAT ERROR (M series)	1) A G41.3 or G40 block contains a move command. 2) A G1.3 block contains a G code or M code for which buffering is suppressed.

Number	Message	Contents
5407	ILLEGAL COMMAND IN G41.3 (M series)	1) A G code that belongs to group 01 except G00 and G01 is specified in G41.3 mode. 2) An offset command (a G code belonging to group 07) is specified in G41.3 mode. 3) The block next to G41.3 (startup) contains no movement.
5408	G41.3 ILLEGAL START_UP (M series)	1) In a mode of group 01 except G00 and G01, G41.3 (startup) is specified. 2) At startup, the included angle of the tool direction vector and move direction vector is 0 or 180 degrees.
5409	ILLEGAL PARAMETER IN G41.3 (M series)	The parameter setting (No. xxxx to xxxx) that determines the relationship between the rotation axis and rotation plane is incorrect.
5411	NURBS:ILLEGAL ORDER (M series)	The number of steps is specified incorrectly.
5412	NURBS:NO KNOT COMMAND (M series)	No knot is specified. Alternatively, in NURBS interpolation mode, a block not relating to NURBS interpolation is specified.
5413	NURBS:ILLEGAL AXIS COMMAND (M series)	An axis not specified with controlled points is specified in the first block.
5414	NURBS:ILLEGAL KNOT (M series)	The number of blocks containing knots only is insufficient.
5415	NURBS:ILLEGAL CANCEL (M series)	Although NURBS interpolation is not completed yet, the NURBS interpolation mode is turned off.
5416	NURBS:ILLEGAL MODE (M series)	A mode that cannot be used with NURBS interpolation mode is specified in NURBS interpolation mode.
5417	NURBS:ILLEGAL MULTI-KNOT (M series)	As many knots as the number of steps are not specified at the start and end points.
5418	NURBS:ILLEGAL KNOT VALUE (M series)	Knots do not increase in monotone.
5420	ILLEGAL PARAMETER IN G43.4/ G43.5 (M series)	A parameter related to pivot tool length compensation is incorrect.
5421	ILLEGAL COMMAND IN G43.4/ G43.5 (M series)	In pivot tool length compensation (type 2) mode, a rotation axis is specified.
5422	EXCESS VELOCITY IN G43.4/G43.5 (M series)	As a result of pivot tool length compensation, an attempt was made to move the tool along an axis at a feedrate exceeding the maximum cutting feedrate.
5425	ILLEGAL OFFSET VALUE (M series)	The offset number is incorrect.
5430	ILLEGAL COMMAND IN 3-D CIR (M series)	In a modal state in which three-dimensional circular interpolation cannot be specified, a three-dimensional circular interpolation (G02.4/G03.4) is specified. Alternatively, in three-dimensional circular interpolation mode, a code that cannot be specified is specified.
5432	G02.4/G03.4 FORMAT ERROR (M series)	A three-dimensional circular interpolation command (G02.4/G03.4) is incorrect.
5433	MANUAL INTERVENTION IN 3-D CIR (M series)	In three-dimensional circular interpolation mode (G02.4/G03.4), manual intervention was made when the manual absolute switch was on.
5435	PARAMETER OUT OF RANGE (TLAC) (M series)	Incorrect parameter setting (set value range)
5436	PARAMETER SETTING ERROR 1 (TLAC) (M series)	Incorrect parameter setting (setting of the rotation axis)
5437	PARAMETER SETTING ERROR 2 (TLAC) (M series)	Incorrect parameter setting (setting of the tool axis)
5440	ILLEGAL DRILLING AXIS SELECTED (M series)	The drilling axis specified for the drilling canned cycle is incorrect. The G code command block of the canned cycle does not specify the Z point of the drilling axis. When there is a parallel axis with the drilling axis, the parallel axis is also specified at the same time.

Number	Message	Contents
5445	CRC:MOTION IN G39 (M series)	Corner circular interpolation (G39) of cutter compensation is not specified alone but is specified with a move command.
5446	CRC:NO AVOIDANCE (M series)	Because there is no interference evade vector, the interference check evade function of cutter compensation cannot evade interference.
5447	CRC:DANGEROUS AVOIDANCE (M series)	The interference check evade function of cutter compensation determines that an evade operation will lead to danger.
5448	CRC:INTERFERENCE TO AVD. (M series)	In the interference check evade function of cutter compensation, a further interference occurs for an already created interference evade vector.
5452	IMPROPER G–CODE (5AXIS MODE) (M series)	A G code that cannot be specified is found. (5–axis mode) This alarm is issued when: 1) Three–dimensional cutter compensation (side–face offset and leading–edge offset) is applied during cutter compensation, or cutter compensation is applied during three–dimensional cutter compensation (side–face offset and leading–edge offset). 2) A leading–edge offset of three–dimensional cutter compensation is applied during side–face offsetting of three–dimensional cutter compensation, or a side–face offset of three–dimensional cutter compensation is applied during leading–edge offsetting of three–dimensional cutter compensation. 3) Tool axis direction tool length compensation is applied during tool length compensation, or tool length compensation is applied during tool axis direction tool length compensation. 4) Tool center point control is provided during tool length compensation, or tool length compensation is applied during tool center point control. 5) Tool center point control is provided during tool axis direction tool length compensation, or tool axis direction tool length compensation is applied during tool center point control. If this alarm is issued, cancel the relevant mode, then specify a different mode.
5453	NOTE: G68 IS CANCELED (HPCC) (M series)	When bit 2 of parameter No. 5400 is set to 1, and a reset does not cancel G68, this alarm is issued at the time of program restart. To release this alarm, press <RESET> and <CAN>. Once this operation is performed, the alarm will not be issued at the next restart.
5455	ILLEGAL ACC. PARAMETER (M series)	A permissible acceleration parameter for optimum torque acceleration/deceleration is incorrect. The cause is one of the following: 1) The ratio of the deceleration rate to the acceleration rate is below the limit. 2) The time required for deceleration to a speed of 0 exceeds the maximum value.

NOTE
HPCC designates High Precision Contour Control.
AICC designates AI Contour Control.

(2) BACKGROUND EDIT ALARMS

Number	Message	Contents
???	BP/S alarm	BP/S alarm occurs in the same number as the P/S alarm that occurs in ordinary program edit. (070, 071, 072, 073, 074 085,086,087 etc.)
140	BP/S alarm	It was attempted to select or delete in the background a program being selected in the foreground. **(Note)** Use background editing correctly.

> **NOTE**
> Alarm in background edit is displayed in the key input line of the background edit screen instead of the ordinary alarm screen and is resettable by any of the MDI key operation.

(3) ABSOLUTE PULSE CODER (APC) ALARMS

Number	Message	Contents
300	APC alarm: nth–axis origin return	Manual reference position return is required for the nth–axis (n=1 – 8).
301	APC alarm: nth–axis communication	nth–axis (n=1 – 8) APC communication error. Failure in data transmission Possible causes include a faulty APC, cable, or servo interface module.
302	APC alarm: nth–axis over time	nth–axis (n=1 – 8) APC overtime error. Failure in data transmission. Possible causes include a faulty APC, cable, or servo interface module.
303	APC alarm: nth–axis framing	nth–axis (n=1 – 8) APC framing error. Failure in data transmission. Possible causes include a faulty APC, cable, or servo interface module.
304	APC alarm: nth–axis parity	nth–axis (n=1 – 8) APC parity error. Failure in data transmission. Possible causes include a faulty APC, cable, or servo interface module.
305	APC alarm: nth–axis pulse error	nth–axis (n=1 – 8) APC pulse error alarm. APC alarm.APC or cable may be faulty.
306	APC alarm: nth–axis battery voltage 0	nth–axis (n=1 – 8) APC battery voltage has decreased to a low level so that the data cannot be held. APC alarm. Battery or cable may be faulty.
307	APC alarm: nth–axis battery low 1	nth–axis (n=1 – 8) axis APC battery voltage reaches a level where the battery must be renewed. APC alarm. Replace the battery.
308	APC alarm: nth–axis battery low 2	nth–axis (n=1 – 8) APC battery voltage has reached a level where the battery must be renewed (including when power is OFF). APC alarm .Replace battery.
309	APC ALARM: n AXIS ZRN IMPOSSIBL	Return to the origin has been attempted without first rotating the motor one or more times. Before returning to the origin, rotate the motor one or more times then turn off the power.

(4) INDUCTSYN ALARMS

Number	Message	Description
330	INDUCTOSYN:DATA ALARM	The absolute–position data (offset data) from Inductosyn cannot be detected.
331	INDUCTOSYN:ILLEGAL PRM	Parameter No. 1874, 1875, or 1876 is set to 0.

(5) SERIAL PULSE CODER (SPC) ALARMS

No.	Message	Description
360	n AXIS : ABNORMAL CHECKSUM (INT)	A checksum error occurred in the built–in pulse coder.
361	n AXIS : ABNORMAL PHASE DATA (INT)	A phase data error occurred in the built–in pulse coder.
362	n AXIS : ABNORMAL REV.DATA (INT)	A rotation speed count error occurred in the built–in pulse coder.
363	n AXIS : ABNORMAL CLOCK (INT)	A clock error occurred in the built–in pulse coder.
364	n AXIS : SOFT PHASE ALARM (INT)	The digital servo software detected invalid data in the built–in pulse coder.
365	n AXIS : BROKEN LED (INT)	An LED error occurred in the built–in pulse coder.
366	n AXIS : PULSE MISS (INT)	A pulse error occurred in the built–in pulse coder.
367	n AXIS : COUNT MISS (INT)	A count error occurred in the built–in pulse coder.
368	n AXIS : SERIAL DATA ERROR (INT)	Communication data from the built–in pulse coder cannot be received.
369	n AXIS : DATA TRANS. ERROR (INT)	A CRC or stop bit error occurred in the communication data being received from the built–in pulse coder.
380	n AXIS : BROKEN LED (EXT)	The LED of separate detector is erroneous.
381	n AXIS : ABNORMAL PHASE (EXT LIN)	A phase data error occurred in the separate linear scale.
382	n AXIS : COUNT MISS (EXT)	A pulse error occurred in the separate detector.
383	n AXIS : PULSE MISS (EXT)	A count error occurred in the separate detector.
384	n AXIS : SOFT PHASE ALARM (EXT)	The digital servo software detected invalid data in the separate detector.
385	n AXIS : SERIAL DATA ERROR (EXT)	Communication data from the separate detector cannot be received.
386	n AXIS : DATA TRANS. ERROR (EXT)	A CRC or stop bit error occurred in the communication data being received from the separate detector.
387	n AXIS : ABNORMAL ENCODER (EXT)	An error occurs in the separate detector. For details, contact the manufacturer of the scale.

● **The details of serial pulse coder alarm**

The details of serial pulse coder alarm are displayed in the diagnosis display (No. 202 and No.203) as shown below.

	#7	#6	#5	#4	#3	#2	#1	#0
202		CSA	BLA	PHA	PCA	BZA	CKA	SPH

#6 (CSA) : The serial pulse coder is defective. Replace it.

#5 (BLA) : The battery voltage is low. Replace the batteries.

#4 (PHA) : The serial pulse coder or feedback cable is defective. Replace the serial pulse coder or cable.

#3 (PCA) : The serial pulse coder is defective. Replace it.

#2 (BZA) : The pulse coder was supplied with power for the first time.
Make sure that the batteries are connected.
Turn the power off, then turn it on again and perform a reference position return.

#1 (CKA) : The serial pulse coder is defective. Replace it.

#0 (SPH) : The serial pulse coder or feedback cable is defective. Replace the serial pulse coder or cable.

	#7	#6	#5	#4	#3	#2	#1	#0
203	DTE	CRC	STB	PRM				

#7 (DTE) : The serial pulse coder encountered a communication error.
The pulse coder, feedbak cable, or feedback receiver circuit is defective.
Replace the pulse coder, feedback cable, or NC–axis board

#6 (CRC) : The serial pulse coder encountered a communication error.
The pulse coder, feedback cable, or feedback receiver circuit is defective.
Replace the pulse coder, feedback cable, or NC–axis board.

#5 (STB) : The serial pulse coder encountered a communication error.
The pulse coder, feedback cable, or feedback receiver circuit is defective.
Replace the pulse coder, feedback cable, or NC–axis board.

#4 (PRM) : An invalid parameter was found. Alarm No. 417 (invalid servo parameter) is also issued.

(6) SERVO ALARMS (1/2)

Number	Message	Contents
401	SERVO ALARM: n–TH AXIS VRDY OFF	The n–th axis (axis 1–8) servo amplifier READY signal (DRDY) went off. Refer to procedure of trouble shooting.
402	SERVO ALARM: SV CARD NOT EXIST	The axis control card is not provided.
403	SERVO ALARM: CARD/SOFT MISMATCH	The combination of the axis control card and servo software is illegal. The possible causes are as follows: · A correct axis control card is not provided. · Correct servo software is not installed on flash memory.
404	SERVO ALARM: n–TH AXIS VRDY ON	Even though the n–th axis (axis 1–8) READY signal (MCON) went off, the servo amplifier READY signal (DRDY) is still on. Or, when the power was turned on, DRDY went on even though MCON was off. Check that the servo interface module and servo amp are connected.
405	SERVO ALARM: (ZERO POINT RETURN FAULT)	Position control system fault. Due to an NC or servo system fault in the reference position return, there is the possibility that reference position return could not be executed correctly. Try again from the manual reference position return.
407	SERVO ALARM: EXCESS ERROR	The following error occurred during simple synchronous control: The difference in machine coordinates between the synchronized axes exceeds the value set in parameter No. 8314.
409	SERVO ALARM: n AXIS TORQUE ALM	Abnormal servo motor load has been detected. Alternatively, abnormal spindle motor load has been detected in Cs mode.
410	SERVO ALARM: n–TH AXIS – EXCESS ERROR	One of the following errors occurred: 1) The positional deviation value when the n–th axis stops exceeds the value set in parameter No. 1829. 2) In simple synchronous control, the compensation amount for synchronization exceeds the value set in parameter No. 8325. This alarm is issued only for the slave axis.
411	SERVO ALARM: n–TH AXIS – EXCESS ERROR	The position deviation value when the n–th axis (axis 1–8) moves is larger than the set value. Refer to procedure of trouble shooting.
413	SERVO ALARM: n–th AXIS – LSI OVERFLOW	The contents of the error register for the n–th axis (axis 1–8) exceeded $\pm 2^{31}$ power. This error usually occurs as the result of an improperly set parameters.

Number	Message	Contents
415	SERVO ALARM: n–TH AXIS – EXCESS SHIFT	A speed higher than 524288000 units/s was attempted to be set in the n–th axis (axis 1–8). This error occurs as the result of improperly set CMR.
417	SERVO ALARM: n–TH AXIS – PARAMETER INCORRECT	This alarm occurs when the n–th axis (axis 1–8) is in one of the conditions listed below. (Digital servo system alarm) 1) The value set in Parameter No. 2020 (motor form) is out of the specified limit. 2) A proper value (111 or –111) is not set in parameter No.2022 (motor revolution direction). 3) Illegal data (a value below 0, etc.) was set in parameter No. 2023 (number of speed feedback pulses per motor revolution). 4) Illegal data (a value below 0, etc.) was set in parameter No. 2024 (number of position feedback pulses per motor revolution). 5) Parameters No. 2084 and No. 2085 (flexible field gear rate) have not been set. 6) A value outside the limit of {1 to the number of control axes} or a non–continuous value (Parameter 1023 (servo axis number) contains a value out of the range from 1 to the number of axes, or an isolated value (for example, 4 not prceded by 3).was set in parameter No. 1023 (servo axisnumber). 7) A torque control parameter is set incorrectly in PMC axis control. (The torque constant parameter is set to 0.)
420	SERVO ALARM: n AXIS SYNC TORQUE (M series)	During simple synchronous control, the difference between the torque commands for the master and slave axes exceeded the value set in parameter No. 2031.
421	SERVO ALARM: n AXIS EXCESS ER (D)	The difference between the errors in the semi–closed loop and closed loop has become excessive during dual position feedback. Check the values of the dual position conversion coefficients in parameters No. 2078 and 2079.
422	SERVO ALARM: n AXIS	In torque control of PMC axis control, a specified allowable speed has been exceeded.
423	SERVO ALARM: n AXIS	In torque control of PMC axis control, the parameter–set allowable cumulative travel distance has been exceeded.
430	n AXIS : SV. MOTOR OVERHEAT	A servo motor overheat occurred.
431	n AXIS : CNV. OVERLOAD	1) PSM: Overheat occurred. 2) β series SVU: Overheat occurred.
432	n AXIS : CNV. LOW VOLT CONTROL	1) PSM: Control power voltage has dropped. 2) PSMR: The control power supply voltage has dropped. 3) β series SVU: The control power supply voltage has dropped.
433	n AXIS : CNV. LOW VOLT DC LINK	1) PSM: The DC link voltage has dropped. 2) PSMR: The DC link voltage has dropped. 3) α series SVU: The DC link voltage has dropped. 4) β series SVU: The DC link voltage has dropped.
434	n AXIS : INV. LOW VOLT CONTROL	SVM: The control power supply voltage has dropped.
435	n AXIS : INV. LOW VOLT DC LINK	SVM: The DC link voltage has dropped.
436	n AXIS : SOFTTHERMAL (OVC)	The digital servo software detected the soft thermal state (OVC).
437	n AXIS : CNV. OVERCURRENT POWER	PSM: Overcurrent flowed into the input circuit.

Number	Message	Contents
438	n AXIS : INV. ABNORMAL CUR-RENT	1) SVM: The motor current is too high. 2) α series SVU: The motor current is too high. 3) β series SVU: The motor current is too high.
439	n AXIS : CNV. OVERVOLT POWER	1) PSM: The DC link voltage is too high. 2) PSMR: The DC link voltage is too high. 3) α series SVU: The C link voltage is too high. 4) β series SVU: The link voltage is too high.
440	n AXIS : CNV. EX DECELERATION POW.	1) PSMR: The regenerative discharge amount is too large. 2) α series SVU: The regenerative discharge amount is too large. Alternatively, the regenerative discharge circuit is abnormal.
441	n AXIS : ABNORMAL CURRENT OFFSET	The digital servo software detected an abnormality in the motor current detection circuit.
442	n AXIS : CNV. CHARGE FAILURE	1) PSM: The spare discharge circuit of the DC link is abnormal. 2) PSMR: The spare discharge circuit of the DC link is abnormal.
443	n AXIS : CNV. COOLING FAN FAIL-URE	1) PSM: The internal stirring fan failed. 2) PSMR: The internal stirring fan failed. 3) β series SVU: The internal stirring fan failed.
444	n AXIS : INV. COOLING FAN FAIL-URE	SVM: The internal stirring fan failed.
445	n AXIS : SOFT DISCONNECT ALARM	The digital servo software detected a broken wire in the pulse coder.
446	n AXIS : HARD DISCONNECT ALARM	A broken wire in the built–in pulse coder was detected by hardware.
447	n AXIS : HARD DISCONNECT (EXT)	A broken wire in the separate detector was detected by hardware.
448	n AXIS : UNMATCHED FEEDBACK ALARM	The sign of feedback data from the built–in pulse coder differs from that of feedback data from the separate detector.
449	n AXIS : INV. IPM ALARM	1) SVM: IPM (intelligent power module) detected an alarm. 2) α series SVU: IPM (intelligent power module) detected an alarm.
453	n AXIS : SPC SOFT DISCONNECT ALARM	Software disconnection alarm of the α pulse coder. Turn off the power to the CNC, then remove and insert the pulse coder cable. If this alarm is issued again, replace the pulse coder.
456	ILLEGAL CURRENT LOOP	The current control cycle settings (parameter No. 2004, bit 0 of parameter No. 2003, and bit 0 of parameter No. 2013) are incorrect. Possible problems are as follows. – For the two axes whose servo axis numbers (settings of parameter No. 1023) are an odd number followed by an even number (a pair of axes 1 and 2 or axes 5 and 6, for example), a different current control cycle is set for each of the axes. – The requirements for slaves needed for the set current control cycle, including the number, type, and connection method of them, are not satisfied.
457	ILLEGAL HI HRV (250US)	Use of high–speed HRV is specified although the current control cycle is 200 μs.
458	CURRENT LOOP ERROR	The current control cycle setting does not match the actual current control cycle.
459	HI HRV SETTING ERROR	Of two axes having adjacent servo axis numbers (parameter No. 1023), odd number and even number, high–speed HRV control can be performed for one axis and not for the other.

Number	Message	Contents
460	n AXIS : FSSB DISCONNECT	FSSB communication was disconnected suddenly. The possible causes are as follows: 1) The FSSB communication cable was disconnected or broken. 2) The power to the amplifier was turned off suddenly. 3) A low–voltage alarm was issued by the amplifier.
461	n AXIS : ILLEGAL AMP INTERFACE	The axes of the 2–axis amplifier were assigned to the fast type interface.
462	n AXIS : SEND CNC DATA FAILED	Because of an FSSB communication error, a slave could not receive correct data.
463	n AXIS : SEND SLAVE DATA FAILED	Because of an FSSB communication error, the servo system could not receive correct data.
464	n AXIS : WRITE ID DATA FAILED	An attempt was made to write maintenance information on the amplifier maintenance screen, but it failed.
465	n AXIS : READ ID DATA FAILED	At power–up, amplifier initial ID information could not be read.
466	n AXIS : MOTOR/AMP COMBINA-TION	The maximum current rating for the amplifier does not match that for the motor.
467	n AXIS : ILLEGAL SETTING OF AXIS	The servo function for the following has not been enabled when an axis occupying a single DSP (corresponding to two ordinary axes) is specified on the axis setting screen. 1. Learning control (bit 5 of parameter No. 2008 = 1) 2. High–speed current loop (bit 0 of parameter No. 2004 = 1) 3. High–speed interface axis (bit 4 of parameter No. 2005 = 1)
468	HI HRV SETTING ERROR(AMP)	Use of high–speed HRV is specified for a controlled axis of an amplifier which does not support high–speed HRV.

● **Details of servo alarm** The details of servo alarm are displayed in the diagnosis display (No. 200 and No.204) as shown below.

	#7	#6	#5	#4	#3	#2	#1	#0
200	OVL	LV	OVC	HCA	HVA	DCA	FBA	OFA

#7 (OVL) : An overload alarm is being generated.
(The details are indicated in diagnostic data No.201).

#6 (LV) : A low voltage alarm is being generated in servo amp.
Check LED.

#5 (OVC) : A overcurrent alarm is being generated inside of digital servo.

#4 (HCA) : An abnormal current alarm is being generated in servo amp.
Check LED.

#3 (HVA) : An overvoltage alarm is being generated in servo amp.
Check LED.

#2 (DCA) : A regenerative discharge circuit alarm is being generated in servo amp.
Check LED.

#1 (FBA) : A disconnection alarm is being generated.
(The details are indicated in diagnostic data No. 201)

#0 (OFA) : An overflow alarm is being generated inside of digital servo.

	#7	#6	#5	#4	#3	#2	#1	#0
201	ALD			EXP				

When OVL equal 1 in diagnostic data No.200 (servo alarm No. 400 is being generated):

#7 (ALD)　0 : Motor overheating

　　　　　　1 : Amplifier overheating

When FBAL equal 1 in diagnostic data No.200 (servo alarm No. 416 is being generated):

ALD	EXP	Alarm details
1	0	Built–in pulse coder disconnection (hardware)
1	1	Separately installed pulse coder disconnection (hardware)
0	0	Pulse coder is not connected due to software.

	#7	#6	#5	#4	#3	#2	#1	#0
204		OFS	MCC	LDA	PMS			

#6 (OFS) : A current conversion error has occured in the digital servo.

#5 (MCC) : A magnetic contactor contact in the servo amplifier has welded.

#4 (LDA) : The LED indicates that serial pulse coder C is defective

#3 (PMS) : A feedback pulse error has occured because the feedback cable is defective.

(7) OVERTRAVEL ALARMS

Number	Message	Contents
500	OVER TRAVEL : +n	Exceeded the n–th axis (axis 1–8) + side stored stroke check I. (Parameter No.1320 or 1326 **NOTE**)
501	OVER TRAVEL : –n	Exceeded the n–th axis (axis 1–8) – side stored stroke check I. (Parameter No.1321 or 1327 **NOTE**)
502	OVER TRAVEL : +n	Exceeded the n–th axis (axis 1–8) + side stored stroke check II. (Parameter No.1322)
503	OVER TRAVEL : –n	Exceeded the n–th axis (axis 1–8) – side stored stroke check II. (Parameter No.1323)
504	OVER TRAVEL : +n	Exceeded the n–th axis (axis 1–8) + side stored stroke check III. (Parameter No.1324)
505	OVER TRAVEL : –n	Exceeded the n–th axis (axis 1–8) – side stored stroke check III. (Parameter No.1325)
506	OVER TRAVEL : +n	Exceeded the n–th axis (axis 1–8) + side hardware OT.
507	OVER TRAVEL : –n	Exceeded the n–th axis (axis 1–8) – side hardware OT.
508	INTERFERENCE: +n (T series (two–path control))	A tool moving in the positive direction along the n axis has fouled another tool post.
509	INTERFERENCE: –n (T series (two–path control))	A tool moving in the negative direction along the n axis has fouled another tool post.
510	OVER TRAVEL: +n	Alarm for stroke check prior to movement. The end point specified in a block falls within the forbidden area defined with the stroke check in the positive direction along the N axis. Correct the program.
511	OVER TRAVEL: –n	Alarm for stroke check prior to movement. The end point specified in a block falls within the forbidden area defined with the stroke check in the negative direction along the N axis. Correct the program.

Number	Message	Contents
514	INTERFERENCE : +n	The rotation area interference check function found interference on the plus side of the n axis.
515	INTERFERENCE : –n	The rotation area interference check function found interference on the minus side of the n axis.

NOTE
Parameters 1326 and 1327 are effective when EXLM(stroke check switch signal) is on.

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(8) SERVO ALARMS (2/2)

Number	Message	Contents
600	n AXIS: INV. DC LINK OVER CURRENT	DC link current is too large.
601	n AXIS: INV. RADIATOR FAN FAILURE	The external dissipator stirring fan failed.
602	n AXIS: INV. OVERHEAT	The servo amplifier was overheated.
603	n AXIS: INV. IPM ALARM(OH)	The IPM (intelligent power module) detected an overheat alarm.
604	n AXIS: AMP. COMMUNICATION ERROR	Communication between the SVM and the PSM failed.
605	n AXIS: CNV. EX. DISCHARGE POW.	PSMR: Regenerative power is too large.
606	n AXIS: CNV. RADIATOR FAN FAILURE	PSM: The external dissipator stirring fan failed. PSMR: The external dissipator stirring fan failed.
607	n AXIS: CNV. SINGLE PHASE FAILURE	PSM: Input voltage is in the open–phase condition. PSMR: Input voltage is in the open–phase condition.

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(9) OVERHEAT ALARMS

Number	Message	Contents
700	OVERHEAT: CONTROL UNIT	Control unit overheat Check that the fan motor operates normally, and clean the air filter.
701	OVERHEAT: FAN MOTOR	The fan motor on the top of the cabinet for the contorl unit is overheated. Check the operation of the fan motor and replace the motor if necessary.
704	OVERHEAT: SPINDLE	Spindle overheat in the spindle fluctuation detection (1) If the cutting load is heavy, relieve the cutting condition. (2) Check whether the cutting tool is share. (3) Another possible cause is a faulty spindle amp.

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(10) RIGID TAPPING ALARMS

Number	Message	Contents
740	RIGID TAP ALARM: EXCESS ERROR	The positional deviation of the stopped spindle has exceeded the set value during rigid tapping.
741	RIGID TAP ALARM: EXCESS ERROR	The positional deviation of the moving spindle has exceeded the set value during rigid tapping.
742	RIGID TAP ALARM: LSI OVERFLOW	An LSI overflow has occurred for the spindle during rigid tapping.

(11) SYSTEM ALARMS

Number	Message	Description
900	ROM PARITY	A parity error occurred in the CNC, macro, or servo ROM. Correct the contents of the flash ROM having the displayed number.
910	SRAM PARITY : (BYTE 0)	A RAM parity error occurred in the part program storage RAM. Clear the RAM, or replace the SRAM module or motherboard. Subsequently, re–set the parameters and all other data.
911	SRAM PARITY : (BYTE 1)	
912	DRAM PARITY : (BYTE 0)	A RAM parity error occurred in the DRAM module. Replace the DRAM module.
913	DRAM PARITY : (BYTE 1)	
914	DRAM PARITY : (BYTE 2)	
915	DRAM PARITY : (BYTE 3)	
916	DRAM PARITY : (BYTE 4)	
917	DRAM PARITY : (BYTE 5)	
918	DRAM PARITY : (BYTE 6)	
919	DRAM PARITY : (BYTE 7)	
920	SERVO ALARM (1–4 AXIS)	Servo alarm (first to fourth axis). A watchdog alarm condition occurred, or a RAM parity error occurred in the axis control card. Replace the axis control card.
921	SERVO ALARM (5–8 AXIS)	Servo alarm (fifth to eighth axis). A watchdog alarm condition occurred, or a RAM parity error occurred in the axis control card. Replace the axis control card.
926	FSSB ALARM	FSSB alarm. Replace the axis control card.
930	CPU INTERRUPT	CPU error (abnormal interrupt). The motherboard or CPU card may be faulty.
935	SRAM ECC ERROR	An error occurred in RAM for part program storage. Action: Replace the master printed circuit board (SRAM module), perform all–clear operation, and set all parameter and other data again.
950	PMC SYSTEM ALARM PCxxx YYYYYYYYYYYYYYY	An error occurred in the PMC. For details of PCxxx, see the list of system alarm messages in Section A.2, "LIST OF ALARMS (PMC)" in this manual.
951	PMC WATCH DOG ALARM	An error occurred in the PMC. (Watchdog alarm) The motherboard may be faulty.
970	NMI OCCURRED IN PMCLSI	With the PMC–SA1, an error occurred in the PMC control LSI device on the motherboard. (I/O RAM parity) Replace the motherboard.
971	NMI OCCURRED IN SLC	With the PMC–SA1, an I/O Link disconnection was detected. Check the I/O Link.

Number	Message	Description
972	NMI OCCURRED IN OTHER MOD-ULE	An NMI occurred on a board other than the motherboard. The option board may be faulty.
973	NON MASK INTERRUPT	An NMI occurred as a result of an unknown cause.
974	F–BUS ERROR	A bus error occurred on the FANUC bus. The motherboard or option board may be faulty.
975	BUS ERROR	A bus error occurred on the motherboard. The motherboard may be faulty.
976	L–BUS ERROR	A bus error occurred on the local bus. The motherboard may be faulty.

(12) PMC ALARMS

No.	Message	Description/Remedy	Remarks
1000	INDEX TOOL NOT SELECTED	A C-axis command is specified for a turret station other than an auto-index turret station. (Correct to the T-number of an auto-index turret station.)	
1001	INDEX ALARM (1)	An auto-index clamp limit switch or auto-index brake limit switch has operated abnormally during the rotation of the turret. (The air pressure may be low, or the limit switch may be abnormal.)	
1005	LUBRICATION PARAM. OFF	The mechanical option parameter (automatic lubrication) K22.6 is "0". (Check the setting of the parameter, and then turn off the power.)	
1006	MACHINE PARAM. OFF	The seventh bit of the mechanical option parameters K0 to K5 is not "1". (Check the setting of each parameter, and then turn off the power.)	
1007	CIRCUIT PROTECTOR TRIP	One of the circuit protectors in the electrical control cabinet or the machine circuit breaker is tripped. (The machine may be overloaded, or the wiring may be short circuited.)	
1008	LUL INTERLOCK-LS	The carriage and U/UL unit are in the interference region. (Move the carriage or U/UL unit away from the interference region.)	
1009	LINE PARM. OFF	The mechanical option parameter (line operation) K50.0 is "0". (Check the setting of the parameter, and then turn off the power.)	
1010	POSITIONER PARAM. OFF	The mechanical option parameter (workclamp positioner specification) K11.3 is "0". (Check the setting of the parameter, and then turn off the power.)	
1011	XY AXIS NEED ZERO-RETURN	Zero-return the X- and Y-axes.	
1013	WORK SCRATCH PARAM. OFF	The mechanical option parameter (workholder base up/down specification) K10.1 is "0". (Check the setting of the parameter, and then turn off the power.)	
1015	MP PARAMETER OFF	The mechanical option parameter (manipulator specification) K50.3 is "0". (Check the setting of the parameter, and then turn off the power.)	
1016	TK PARAM. OFF	The mechanical option parameters (takeout loader specification) K17.1 and (line specification) K50.0 are "0". (Check the setting of each parameter, and then turn off the power.)	

No.	Message	Description/Remedy	Remarks
1020	REPOS. BASE POS. (F)-LS	The front workholder base is not at the lower end, or its proximity switch (LWHF) is abnormal.	
1021	REPOS. BASE POS. (R)-LS	The rear workholder base is not at the lower end, or its proximity switch (LWHR) is abnormal.	
1050	T-AXIS INPOSITION OFF	The T-axis in-position switch (INPT) does not turn on. (The T-axis may be jammed, or its origin position may be improper.)	
1060	AI CLAMP (ON) UPPER (A) LS	The auto-index clamp solenoid valve turned on, but the upper clamp (A) proximity switch (LCPUA) did not turn on. (The auto-index clamp may be faulty, the proximity switch may be abnormal, or the air pressure may be low.)	
1061	AI CLAMP (ON) UPPER (B) LS	The auto-index clamp solenoid valve turned on, but the lower clamp (B) proximity switch (LCPUB) did not turn on. (The auto-index clamp may be faulty, the proximity switch may be abnormal, or the air pressure may be low.)	
1062	AI CLAMP (ON) LOWER (A) LS	The auto-index clamp solenoid valve turned on, but the lower clamp (A) proximity switch (LCPDA) did not turn off. (The auto-index clamp may be faulty, the proximity switch may be abnormal, or the air pressure may be low.)	
1063	AI CLAMP (ON) LOWER (B) LS	The auto-index clamp solenoid valve turned on, but the lower clamp (B) proximity switch (LCPDB) did not turn on. (The auto-index clamp may be faulty, the proximity switch may be abnormal, or the air pressure may be low.)	
1064	AI CLAMP (OFF) UPPER (A) LS	The auto-index clamp solenoid valve turned off, but the upper clamp (A) proximity switch (LCPUA) did not turn on. (The auto-index clamp may be faulty, or the proximity switch may be abnormal.)	
1065	AI CLAMP (OFF) UPPER (B) LS	The auto-index clamp solenoid valve turned off, but the upper clamp (B) proximity switch (LCPUB) did not turn off. (The auto-index clamp may be faulty, or the proximity switch may be abnormal.)	
1066	AI CLAMP (OFF) LOWER (A) LS	The auto-index clamp solenoid valve turned off, but the lower clamp (A) proximity switch (LCPDA) did not turn on. (The auto-index clamp may be faulty, or the proximity switch may be abnormal.)	

No.	Message	Description/Remedy	Remarks
1067	AI CLAMP (OFF) LOWER (B) LS	The auto-index clamp solenoid valve turned off, but the lower clamp (B) proximity switch (LCPDB) did not turn off. (The auto-index clamp may be faulty, or the proximity switch may be abnormal.)	
1068	AI BRAKE (ON) UPPER (A) LS	The auto-index clamp solenoid valve turned on, but the upper brake (A) proximity switch (LBKUA) and upper brake (B) proximity switch (LBKUB) both remained off. (The proximity switches may be abnormal, or the air pressure may be low.)	
1069	AI BRAKE (ON) UPPER (B) LS	The auto-index clamp solenoid valve turned on, but the upper brake (A) proximity switch (LBKUA) and upper brake (B) proximity switch (LBKUB) both remained on. (The proximity switches may be abnormal, or the air pressure may be low.)	
1070	AI BRAKE (ON) LOWER (A) LS	Proximity switch specification: The auto-index brake solenoid valve turned on, but the lower brake (A) proximity switch (LBKDA) did not turn off. (The proximity switch may be abnormal, or the air pressure may be low.) Pressure switch specification: The auto-index brake solenoid valve turned on, but the lower brake (release) pressure switch (P/SBRK) did not turn on. (The proximity switch may be abnormal, or the air pressure may be low.)	
1071	AI BRAKE (ON) LOWER (B) LS	Proximity switch specification: The auto-index brake solenoid valve turned on, but the lower brake (B) proximity switch (LBKDB) did not turn off. (The proximity switch may be abnormal, or the air pressure may be low.) Pressure switch specification: The auto-index brake solenoid valve turned on, but the lower brake (release) pressure switch (P/SBRK) did not turn on. (The proximity switch may be abnormal, or the air pressure may be low.)	
1072	AI BRAKE (OFF) UPPER (A) LS	The auto-index brake solenoid valve turned off, but the upper brake (A) proximity switch (LBKUA) did not turn on. (The proximity switch may be abnormal.)	
1073	AI BRAKE (OFF) UPPER (B) LS	The auto-index brake solenoid valve turned off, but the upper brake (B) proximity switch (LBKUB) did not turn on. (The proximity switch may be abnormal.)	

No.	Message	Description/Remedy	Remarks
1074	AI BRAKE (OFF) LOWER (A) LS	Proximity switch specification: The auto-index brake solenoid valve turned off, but the lower brake (A) proximity switch (LBKDA) did not turn on. (The proximity switch may be abnormal.) Pressure switch specification: The auto-index brake solenoid valve turned off, but the lower brake (release) pressure switch (P/SBRK) did not turn off. (The proximity switch may be abnormal.)	
1075	AI BRAKE (OFF) LOWER (B) LS	Proximity switch specification: The auto-index brake solenoid valve turned off, but the lower brake (B) proximity switch (LBKDB) did not turn on. (The proximity switch may be abnormal.) Pressure switch specification: The auto-index brake solenoid valve turned off, but the lower brake (release) pressure switch (P/SBRK) did not turn off. (The proximity switch may be abnormal.)	
1076	AI STATION (OFF)	An auto-index station is positioned below the striker, but it cannot be confirmed that the auto-index station is selected. (The origin position of the T-axis may be improper, or the parameter may be improperly set.)	
1077	AI STATION (ON)	The station positioned below the striker is not an auto-index station, but it is displayed that an auto-index station is selected.	
1080	SHOTPIN (ON) UPPER (IN) LS	The turret index pin solenoid valve turned on, but the upper turret index pin (IN) proximity switch (LSPIA) did not turn on. (The proximity switch may be abnormal, or the air pressure may be low.)	
1081	SHOTPIN (ON) LOWER (IN) LS	The turret index pin solenoid valve turned on, but the lower turret index pin (IN) proximity switch (LSPIB) did not turn on. (The proximity switch may be abnormal, or the air pressure may be low.)	
1082	SHOTPIN (ON) UPPER (OUT) LS	The turret index pin solenoid valve turned on, but the upper turret index pin (OUT) proximity switch (LSPOA) did not turn off. (The proximity switch may be abnormal, or the air pressure may be low.)	
1083	SHOTPIN (ON) LOWER (OUT) LS	The turret index pin solenoid valve turned on, but the lower turret index pin (OUT) proximity switch (LSPOB) did not turn off. (The proximity switch may be abnormal, or the air pressure may be low.)	

No.	Message	Description/Remedy	Remarks
1084	SHOTPIN (OFF) UPPER (IN) LS	The turret index pin solenoid valve turned off, but the upper turret index pin (IN) proximity switch (LSPIA) did not turn off. (The proximity switch may be abnormal.)	
1085	SHOTPIN (OFF) LOWER (IN) LS	The turret index pin solenoid valve turned off, but the lower turret index pin (IN) proximity switch (LSPIB) did not turn off. (The proximity switch may be abnormal.)	
1086	SHOTPIN (OFF) UPPER (OUT) LS	The turret index pin solenoid valve turned off, but the upper turret index pin (OUT) proximity switch (LSPOA) did not turn on. (The proximity switch may be abnormal.)	
1087	SHOTPIN (OFF) LOWER (OUT) LS	The turret index pin solenoid valve turned off, but the lower turret index pin (OUT) proximity switch (LSPOB) did not turn on. (The proximity switch may be abnormal.)	
1090	STRIKER INSIDE-LS	The striker was moved, but the striker (inside) proximity switch (LSTI) did not turn on. (The proximity switch may be abnormal, or the air pressure may be low.)	
1091	STRIKER MIDDLE-LS	The striker was moved, but the striker (middle) proximity switch (LSTM) did not turn on. (The proximity switch may be abnormal, or the air pressure may be low.)	
1092	STRIKER OUTSIDE-LS	The striker was moved, but the striker (outside) proximity switch (LSTO) did not turn on. (The proximity switch may be abnormal, or the air pressure may be low.)	
1095	T408-OFF M254-ON ERROR	T408 turned off while M254 was being commanded. (Check the punching program.)	
1100	G92-G05 ALARM	G92 was commanded before G05. (Correct the punching program.)	
1101	G33-G05 ALARM	M33 was commanded before G05. (Correct the punching program.)	
1143	AIR PRESSURE SWITCH NG.	The low air pressure detection pressure switch (P/SPAN) circuit is abnormal. (The air pressure may also be low.)	

No.	Message	Description/Remedy	Remarks
1144	INDEX CLAMP NG.	The auto-index clamp solenoid valve turned on, but the clamp proximity switches did not turn on. (LCPUA and LCPDA turned off, and LCPUB and LCPDB did not turn on.) Or the auto-index solenoid valve turned off, but the clamp proximity switches did not turn off. (LCPUA and LCPDA did not turn on, and LCPUB and LCPDB did not turn off.) (The proximity switches may be abnormal, or the air pressure may be low.)	
1145	SHOTPIN NG.	The turret index pin solenoid valve turned on, but the turret index pins were not inserted in the turret. (LSPIA and LSPIB did not turn on, and LSPIO and LSPOB did not turn off.) The turret index pin solenoid valve turned off, but the turret index pins were not removed from the turret. (LSPIA and LSPIB did not turn off, and LSPIO and LSPOB did not turn on.) (The proximity switches may be abnormal, or the air pressure may be low.)	
1146	STRIKER NG.	The striker outside solenoid valve turned on, but the striker did not move to the outside position. (LSTO did not turn on, and LSTI did not turn off.) The striker outside solenoid valve turned off, but the striker did not move to the inside position. (LSTO did not turn off, and LSTI did not turn on.) (The proximity switches may be abnormal, or the air pressure may be low.)	
1150	CLAMP POSITION READ ERROR	When the number of times the workclamp position reading sensor turned on was counted from the start to the end of measurement, the count was not two for the two-workclamp specification and three for the three-workclamp specification. (Check the setting of the workclamp quantity. Clean the workclamp position reading plate.)	
1151	G92 NOT EXECUTED	The machine tried to punch the worksheet without executing G92 once and reading the workclamp position. (Correct the punching program.)	
1201	4A. I. PARAM. ON	The mechanical option parameter (4 auto-index) K10.2 is "1". (Check the setting of the parameter, and then turn off the power.)	

No.	Message	Description/Remedy	Remarks
1202	W. CLAMP DETECTION PRM. ON	The mechanical option parameter (constant worksheet clamp position monitoring) K51.1 is "1". (Check the setting of the parameter, and then turn off the power.)	
1203	AIR DOWN RESET PARAM. OFF	The mechanical option parameter (SAFETY DEVICE & AIR DOWN RESET button) K1.2 is "0". (The SAFETY DEVICE & AIR DOWN RESET button was pressed although the parameter was "0".) (Check the setting of the parameter, and then turn off the power.)	
1204	DOUBLE HAND (T) PRM. OFF	The mechanical option parameter (turret two-hand operation) K13.6 is "0". (The TURRET JOG ON button was pressed although the parameter was set to "0".) (Check the setting of the parameter, and then turn off the power.)	
1205	SAFETY DEVICE PARAM. OFF	The mechanical option parameter (SAFETY DEVICE keyswitch OFF) K1.2 is "0". (The SAFETY DEVICE keyswitch was turned to OFF although the parameter was set to "0".) (Check the setting of the parameter, and then turn off the power.)	
1206	D-HAND (T-EC) PRM. ALARM	The turret two-hand operation parameter 13.6 is wrong. (K13.6 was "0", but K1.2 was "1".) (Check the settings of the parameters, and then turn off the power.)	
1209	AIR BLOW PRM. INPUT ERROR	The values of the mechanical option parameters were improperly entered. K11.0 and K11.1 are both "1". (Check the settings of the parameters, and then turn off the power.)	
1210	T-APPROACH MVX, MVY ON	When tap turret T8 was commanded, the X- and Y-axis move commands MVX and MVY turned on.	
1211	T-APPROACH T-TURRET ON	With the multiple-tap specification, the tap turret tried to rotate during quick approach.	
1220	RDV1 AMP ALARM	An alarm occurred in the RDV servo amplifier that controls the press. For details, check the 7-segment LED of the RDV amplifier.	
1221	RDV1 REFERENCE RETURN NG	The zero-return of RDV1 was not normally completed.	
1222	RDV2 AMP ALARM	An alarm occurred in the RDV servo amplifier that controls the die. For details, check the 7-segment LED of the RDV amplifier.	
1223	RDV2 REFERENCE RETURN NG	The zero-return of RDV2 was not normally completed.	

No.	Message	Description/Remedy	Remarks
1224	WORKCHUTE THERMAL TRIP	The workchute (roller or conveyor) thermal relay is tripped. Check for any obstacles or problems, and reset the thermal relay. (For the 300 mm square workchute, this alarm is displayed only when the workchute conveyor is installed.)	
1227	PHNC2 ALARM	An alarm occurred in the hydraulic control system PHNC2. Check the details by pressing the PHNC button on the current value display and looking at "Detailed description of alarm".	
1230	PHNC2 WARNING	A warning occurred in PHNC2. Check the details by pressing the PHNC button on the current value display and looking at "Detailed description of alarm".	
1231	SCRAP CONVEYOR1 THERMAL TRIP	The thermal relay of the scrap conveyor 1 is tripped. (The motor may be overloaded.)	
1232	SCRAP CONVEYOR2 THERMAL TRIP	The thermal relay of the scrap conveyor 2 is tripped. (The motor may be overloaded.)	
1233	FUSE BREAK	The fuse on the HMZF1 board was blown. Remove the cause, and change the blown fuse for an accessory fuse. (The wiring in the machine or electrical control cabinet may be short-circuited.) Note: When a fuse is blown, the power cannot be turned off by pressing the POWER OFF button. In that case, press and hold the AUTO POWER OFF button on PANEL A for 2 sec or more to turn off the power.	
1234	PROGRAM DISAGREEMENT	The program of CNC does not agree with that of AMNC. (Check the program called.)	
1235	SCHEDULE PLAN STOP	This is an alarm that occurs during schedule operation. It occurs when the program you tried to execute during schedule operation requires setup. Restart the schedule operation after completing the setup or setting the application on the maintenance display so as to make no setup calculation.	
1236	THERE IS NO JOB BELOW THE START JOB	This is an alarm that occurs during schedule operation. It occurs when there are no jobs to assign. For example, no jobs are registered after the specified start job, or the number of worksheets already processed reaches the number of worksheets to be processed in all jobs after the start job. Restart the schedule operation after changing the start job, registering other jobs, or changing the number of worksheets already processed.	

No.	Message	Description/Remedy	Remarks
1237	SCHEDULE FILE NOT FOUND	This is an alarm that occurs during schedule operation. It occurs when an entity file is not available for the job program registered in the schedule.	
1238	SCHEDULE DOWNLOAD FAILED	This is an alarm that occurs during schedule operation. It occurs when program transfer processing to be internally executed fails just after the start of the schedule or at the change of one job to another. The NC unit is in such a condition as not to accept program transfer. For example, an NC alarm is caused. Press the RESET key, and restart the schedule operation.	
1239	SCHEDULE MACRO ACCESS FAILED	This is an alarm that occurs during schedule operation. It occurs when macro variable read/write processing to be internally executed fails just after the start of the schedule or at the change of one job to another. The NC unit is in such a condition as not to accept macro variable access. For example, an NC alarm is caused. Press the RESET key, and restart the schedule operation.	
1240	SCHEDULE LOGICAL ERROR	This is an alarm that occurs during schedule operation. It is related to the schedule function.	
1241	SCHEDULE UNEXPECT REQUEST	This alarm occurs when the NC unit issues a request event about the schedule to the Windows application, although it is not in the schedule operation mode.	
1242	SCHEDULE RESULT TOO MUCH	This is an alarm that occurs during schedule operation. It occurs when the number of worksheets already processed exceeds the number of worksheets to be processed.	
1243	SCHEDULE START JOB INVALID	This is an alarm that occurs during schedule operation. It occurs when the start job is not specified on the SCHEDULE display or a number without job is specified on the SCHEDULE display. Change the start job to any other suitable job, and restart the schedule operation.	
1244	SCHEDULE EXECUTION BY FIRST PART PROCESS	This is an alarm that occurs during schedule operation. It occurs when the schedule is executed by changing the setting of multiple-part punching to first-part punching. Restart the schedule operation by changing the setting of multiple-part punching to remaining parts or all-parts punching.	

No.	Message	Description/Remedy	Remarks
1245	OPERATION MODE DISAGREEMENT	This is an alarm that occurs with the line specification. It occurs when the standalone operation start button is pressed on the line control panel while the NC unit is in the schedule mode or when the schedule start button is pressed on the line control panel while the NC unit is in the standalone operation mode.	
1246	PROCESS REOPENING MODE	This is a punching resumption mode.	
1247	PROCESS REOPENING START	While the NC unit was in the punching operation resumption mode, the punching operation resumption button was not pressed, but the START button was pressed. To resume the punching operation, press the START button after the punching operation resumption button.	
1250	PMC CALCULATION ERROR	An error occurred in the calculation processing of PMC.	
1251	TEMPERATURE OF A-AXIS MOTOR RISES TOO MUCH	The temperature of the A-axis motor is too high. The machine is stopped in the alarm condition until the temperature of the A-axis motor returns to normal.	
1260	A-AXIS CPU ERROR	A CPU error alarm occurred in the A-axis amplifier.	
1261	A-AXIS OVER CURRENT	An overcurrent alarm occurred in the A-axis amplifier.	
1262	A-AXIS OVER VOLTAGE	An overvoltage alarm occurred in the A-axis amplifier.	
1270	M, T-CODE ALARM	An M-code or T-code that not to be processed (or to be received) by CEXEC was received. (Correct the punching program.)	
1271	PUNCH POWER ALARM	Calculation of the force required to punch the worksheet indicates that the worksheet cannot be punched even if the ram speed is reduced. (The required punching force exceeds the press capacity of the machine.)	
1272	STROKE ABNORMAL (POSITION)	An error occurred in the positional sequence of upper end < decelerate position < lower end. (Check the settings of the press pattern parameters.)	
1273	STROKE ABNORMAL (WAITING POS.)	An error occurred in the positional sequence of second top dead center ≤ upper end, upper end ≤ decelerate position, or upper end ≤ (reference die top surface – worksheet thickness). (Check the settings of the press pattern parameters.)	

No.	Message	Description/Remedy	Remarks
1274	STROKE ABNORMAL (P-FIN POINT)	An error occurred in the positional sequence of punching finish point ≤ (reference die top surface – worksheet thickness – compensation value), or upper end < punching finish point. (Check the settings of the press pattern parameters.)	
1275	STROKE ABNORMAL (SLOW POS.)	An error occurred in the positional sequence of decelerate position < lower end after compensation. (Check the settings of the press pattern parameters.)	
1276	STROKE ABNORMAL (BOTTOM POS.)	An error occurred in the positional sequence of lower end < lower end limiting position. (Check the settings of the press pattern parameters.)	
1277	CHECK TIME EXCESS ALARM	This alarm message informs you that the current date has exceeded the inspection date set on the INSPECTION display in the maintenance displays. (Inspect and maintain the related component or components, and then press the COMPLETE button on the INSPECTION display.)	
1278	LINE CONNECTION ERROR	An error occurred in line communication. (The power of the line may be turned off, or the communication cable may be broken.) (Turn the LINE CONTROL keyswitch to OFF to enable the standalone operation of the machine.)	
1279	WTRAMX ABNORMAL	An interface error occurred during writing of a press parameter. (Press the RESET key, and do again.)	
1280	SUB SHOT PIN (ON) UPPER (IN) LS	The sub shot pin solenoid valve turned on, but the sub shot pin upper (IN) proximity switch (SSPUI) did not turn on. (The proximity switch may be abnormal, or the air pressure may be low.)	
1281	SUB SHOT PIN (ON) LOWER (IN) LS	The sub shot pin solenoid valve turned on, but the sub shot pin lower (IN) proximity switch (SSPLI) did not turn on. (The proximity switch may be abnormal, or the air pressure may be low.)	
1282	SUB SHOT PIN (ON) UPPER (OUT) LS	The sub shot pin solenoid valve turned on, but the sub shot pin upper (OUT) proximity switch (SSPUO) did not turn off. (The proximity switch may be abnormal, or the air pressure may be low.)	

No.	Message	Description/Remedy	Remarks
1283	SUB SHOT PIN (ON) LOWER (OUT) LS	The sub shot pin solenoid valve turned on, but the sub shot pin lower (OUT) proximity switch (SSPLO) did not turn off. (The proximity switch may be abnormal, or the air pressure may be low.)	
1284	SUB SHOT PIN (OFF) UPPER (IN) LS	The sub shot pin solenoid valve turned off, but the sub shot pin upper (IN) proximity switch (SSPUI) did not turn off. (The proximity switch may be abnormal, or the air pressure may be low.)	
1285	SUB SHOT PIN (OFF) LOWER (IN) LS	The sub shot pin solenoid valve turned off, but the sub shot pin lower (IN) proximity switch (SSPLI) did not turn off. (The proximity switch may be abnormal, or the air pressure may be low.)	
1286	SUB SHOT PIN (OFF) UPPER (OUT) LS	The sub shot pin solenoid valve turned off, but the sub shot pin upper (OUT) proximity switch (SSPUO) did not turn on. (The proximity switch may be abnormal, or the air pressure may be low.)	
1287	SUB SHOT PIN (OFF) LOWER (OUT) LS	The sub shot pin solenoid valve turned off, but the sub shot pin lower (OUT) proximity switch (SSPLO) did not turn on. (The proximity switch may be abnormal, or the air pressure may be low.)	
1288	SUPPORT COVER DESCENT ABNORMALITY LS	The support cover descent solenoid valve turned on, but the lower end limit switch did not turn on. (The limit switch may be abnormal, or the air pressure may be low.)	
1300	MAIN CNC COMMUNICATION ERROR	A physical error or a logical error like a protocol error occurred in the communication with the CNC unit. (An HSSB communication error occurred between the PANEL i and the CNC unit (160i/180i)). (Turn off the power, and then turn it back on.)	
1301	PDC/ATC COMMUNICATION ERROR	A physical error or a logical error like a protocol error occurred in the communication with the PDC/ATC (PMiH). (An HSSB communication error occurred between the PANEL i and Power Mate i-H.) (Turn off the power, and then turn it back on.)	
1302	TOOL DB VERIFY ERROR	A verify error occurred between the SRAM in the CNC unit or PDC/ATC of the machine and the tool data base. (Turn off the power, and then turn it back on.)	
1303	TOOL DB ERROR	A logical error in the tool data base or an access error to the tool data base or related files occurred. (Turn off the power, and then turn it back on.)	

No.	Message	Description/Remedy	Remarks
1304	NC NOT READY (POWER MATE I-D)	The NC unit (Power Mate I-D) of the multiple-station tapping unit is not powered on, is not connected with that of the machine, or has a system alarm.	
1305	MAC ID INJUSTICE (D-NET)	The MAC-ID is not properly set. (Check that the MAC-ID is properly set in the D-NET settings.)	
1306	MAC ID DUPLICATION (D-NET)	Duplicate MAD-IDs were set. (Check that the MAC-ID in the D-NET settings is not duplicated on the bus and slave sides.)	
1307	BUS ERROR (D-NET)	A bus error occurred. (Check the D-NET bus settings for errors, and check the condition of the status signals R1500 to R1507.)	
1308	D-NET ERROR	An error other than 1305, 1306 and 1307 occurred at the start of communication. (Check the D-NET bus or slave settings for errors, and check the condition of the status signals R1500 to 1507.)	
1312	TAP RAISE ABNORMAL	The tap raise solenoid valve turned on, but the tap raise confirmation pressure switch did not turn on. Or the tap raise solenoid valve turned off, but the tap raise confirmation pressure switch did not turn off. (The pressure switch may be abnormal, or the air pressure may be low.)	
1313	TAP INDEXPIN ABNORMAL	The tap index pin solenoid valve turned on, but the tap index pin (OUT) limit switch did not turn on. Or the tap index pin solenoid valve turned off, but the tap index pin (OUT) limit switch did not turn off. (The proximity switch may be abnormal, or the air pressure may be low.)	
1314	MEASUREMENT DEVICE ERROR	A communication error occurred between the CNC unit and operation backup unit. The self-diagnostic function is disabled. (Turn off the power.)	
1315	WORKCLAMPS POSITION ERROR	The workclamp position specified by G05 is different from the actual workclamp position. (Check that the workclamps are securely fixed to the carriage.)	
1331	MP SEQUENCER COMMUNICATION ERR.	The MP failed to communicate with the MP sequencer in the MP remote schedule operation specification.	
1332	MP SEQUENCER CMD TRANS. ERR.	The MP received error data from the MP sequencer in the MP remote schedule operation specification.	

No.	Message	Description/Remedy	Remarks
1333	MP SEQUENCER NOT READY	The MP is not ready for communication with the MP sequencer in the MP remote schedule operation specification.	
1334	MP SCHEDULE NOT READY	The MP is not ready for operation in the MP remote schedule operation specification.	
1335	MP SCHEDULE TIME OUT	The MP exceeded the time limit from the unloading of the processed worksheet to the loading of the next worksheet in the MP remote schedule operation specification.	
1336	PROGRAM CHECK UNRELEASE	The EMERGENCY STOP button was pressed with the PROGRAM CHECK button already pressed. (Turn off the power.)	
1337	M T CODE SIMULTANEOUS INSTRUCTION	The M-code and T-code were specified in the same block. (Check the processing program.)	
2002	BATTERY (SERVO)	The pulse coder battery is low in voltage. (With the NC unit powered on, change the batter for a new one.) (The ram axis encoder I/F board battery may also be low in voltage.)	
2003	W. DOG TIMER 2 (SUB-PUNCH)	The sub-punch command is not completed. (It is not completed within 10 sec.)	
2004	SUB-PUNCH ALARM	The sub-punch is in the home position, or the sub-punch upper end limit switch is turned off. (Check the limit switch and circuit.)	
2005	W. DOG TIMER1 (SUB-PUNCH)	The sub-punch command is not completed. (It is not completed within 1.5 sec.)	
2006	M254-ON MCX, MCY-ON ERROR	While M254 (sub-punch cutting) was being commanded, the X- and Y-axis move commands turned on.	
2007	BATTERY	The memory backup battery of the NC unit is low in voltage. (With the power of the NC unit turned on, change the battery for a new one.)	
2008	PHNC WARNING	A warning occurred in PHNC. Check the details by pressing the PHNC softkey on the current value display and looking at "Detailed description of alarm".	
2009	TOOL NOT SELECTED	The machine tried to punch the worksheet although no T command was specified. (Correct the punching program.)	
2010	SETTING SW	The SAFETY DEVICE keyswitch is turned to SETTING.	
2011	WORK JAMMING	A worksheet bow was detected.	
2013	X ORIGIN-LS	The X-axis origin limit switch is abnormal. (Retry zero-return.)	

No.	Message	Description/Remedy	Remarks
2014	Y ORIGIN-LS	The Y-axis origin limit switch is abnormal. (Retry zero-return.)	
2016	OIL LEVEL DOWN	The hydraulic oil tank is low on oil. The normal oil level float switch (HDSD) turned off.	
2019	ACTUAL HITS EXCEEDED	The number of actual hits exceeded the maximum preset number of hits. (There are tools that must be ground.)	
2020	WATCH DOG TAPPING	The multiple-tapping finish signal is not returned.	
2030	TAP OVERRIDE	A workclamp is placed in the tapping position.	
2031	HYD. MOTOR STOP	The hydraulic pump motor stopped. (Check the HYD. MOTOR switch and the thermal relay of the hydraulic pump motor.)	
2032	TK INTERLOCK-LS	The takeout loader moved beyond the safe area.	
2033	FILTER (MACHINE) NG	The filter normal pressure switch (HDFL) turned off while the hydraulic pump motor was running. (Filter in machine)	
2034	FILTER (HYD. UNIT) NG	The filter normal pressure switch (HDFL) turned off while the hydraulic pump motor was running. (Filter in hydraulic unit)	
2035	T ORIGIN-LS	The T-axis origin limit switch is abnormal. (Retry zero-return.)	
2036	C ORIGIN-LS	The C-axis origin limit switch is abnormal. (Retry zero-return.)	
2039	W. DOG TIMER (TF, TURRET)	Turret indexing is not completed within the time as specified by the T command. (The TIE signal did not turn on.)	
2042	W. DOG TIMER (M10)	The M10 (work hold and unclamp) command is not completed within the specified time. (The pressure switch may be abnormal, or the air or oil pressure may be low.)	
2043	W. DOG TIMER (M11)	The M11 (work clamp and release) command is not completed within the specified time. (The pressure switch may be abnormal, or the air or oil pressure may be low.)	
2044	W. DOG TIMER (M80)	The M80 (workchute open) command is not completed within the specified time. (The limit switch may be abnormal, or the air pressure may be low.) Check and reset the limit switches, solenoid valves, and mechanisms in the related operating parts.	

No.	Message	Description/Remedy	Remarks
2045	W. DOG TIMER (M81)	The M81 (workchute close) command is not completed within the specified time. (The limit switch may be abnormal, or the air pressure may be low.) Check and reset the limit switches, solenoid valves, and mechanisms in the related operating parts.	
2046	W. DOG TIMER (M84)	The M84 (work selector left) command is not completed within the specified time. (The limit switch may be abnormal, or the air pressure may be low.)	
2047	W. DOG TIMER (M85)	The M85 (work selector right) command is not completed within the specified time. (The limit switch may be abnormal, or the air pressure may be low.)	
2048	W. DOG TIMER (M90)	The M90 (clamp positioner, workclamp 1 clamp) command is not completed within the specified time. (The workclamp 1 clamp pressure switch does not turn on.) (The pressure switch may be abnormal, or the air pressure may be low.)	
2049	W. DOG TIMER (M91)	The M91 (clamp positioner, workclamp 2 clamp) command is not completed within the specified time. (The workclamp 2 clamp pressure switch does not turn on.) (The pressure switch may be abnormal, or the air pressure may be low.)	
2050	W. DOG TIMER (M92)	The M92 (clamp positioner, workclamp 1 move) command is not completed within the specified time. (The workclamp 1 move pressure switch does not turn on.) (The pressure switch may be abnormal, or the air pressure may be low.)	
2051	W. DOG TIMER (M93)	The M93 (clamp positioner, workclamp 2 move) command is not completed within the specified time. (The workclamp 2 move pressure switch does not turn on.) (The pressure switch may be abnormal, or the air pressure may be low.)	
2052	W. DOG TIMER (M94)	The M94 (clamp positioner, workclamp open) command is not completed within the specified time. (The workclamp pressure switch does not turn off.) (The pressure switch may be abnormal, or the air pressure may be low.)	
2053	W. DOG TIMER (M95)	The M95 (clamp positioner, workclamp close) command is not completed within the specified time. (The pressure switch may be abnormal, or the air pressure may be low.)	
2054	W. DOG TIMER (M96)	The M96 (subprogram call) command is not completed within the specified time.	

No.	Message	Description/Remedy	Remarks
2055	WAITING FOR A AXIS POWER	Wait for a while before the A-axis servo amplifier starts up.	
2056	BOTTOM POS ERROR	The ram did not reach the lower end.　(The press capacity may be exceeded.)	
2057	A AXIS MOTOR OFF	The power of the A-axis servomotor is turned off.	
2058	PRESS MOTOR THERMAL TRIP	The thermal relay of the press motor tripped. (Press the RESET key to clear the alarm.)	
2059	HYD. MOTOR THERMAL TRIP	The thermal relay of the hydraulic pump motor tripped.　(Press the RESET key to clear the alarm.)	
2060	OVERRIDE	The machine entered the override zone and stopped.　(Check the area around each workclamp.　If there is no problem, press the START button.)	
2061	AIR PRESSURE	The air pressure is low.	
2062	TOOL CHANGE DOOR	The tool change door or doors are open.	
2063	X-GAUGE BLOCK	The X-gauge block is raised.	
2064	STRIPPING	A stripping mistake occurred.　(If there is no problem, restart.)	
2065	TOOL CHANGE SWITCH	The TOOL CHANGE keyswitch is turned to ON.	
2066	CNC WINDOW BUSY	The CNC window function is busy.	
2067	AUTOMATION ERROR	An error occurred between the C-EXE and AF interfaces.	
2068	CNC WINDOW ERROR	An error occurred in the CNC window function.	
2069	WORKCLAMPS	The workclamps are open.	
2070	PRESS CONTROL (#LNBS) LS	The nibbling start proximity switch (#LNBS) is abnormal.	
2071	PRESS CONTROL (#LCOF) LS	The clutch off proximity switch (#LCOF) is abnormal.	
2072	PRESS CONTROL (#LCU) LS	The top dead center proximity switch (#LCU) is abnormal.	
2073	SAFETY STOP	The protective device is disconnected.　(Reset the protective device, check for safety, and press the SAFETY DEVICE & AIR DOWN RESET button.)	
2074	TABLE OPEN	The up/down table is open.	
2075	LUBRICATION	This is a lubrication alarm.　(Add grease or oil.)	

No.	Message	Description/Remedy	Remarks
2076	REPOSITIONING	Check the workholder cylinders for interference with the workclamps. (If there is no problem, restart.)	
2077	STOP BUTTON	The STOP button is pressed.	
2078	M-CODE BCD CHANGE ERROR	An error occurred in the M-code conversion of the machine control sequence ladder.	
2079	T-CODE BCD CHANGE ERROR	An error occurred in the T-code conversion of the machine control sequence ladder.	
2080	POSITIONER CLAMP +OT	With the clamp positioner specification, one of the workclamps tripped the +OT proximity switch (WC + OT). (Zero-return again.)	
2081	POSITIONER CLAMP –OT	With the clamp positioner specification, one of the workclamps tripped the –OT proximity switch (WC – OT). (Zero-return again.)	
2082	POSITIONER CLAMP GAP OT	With the clamp positioner specification, overtravel (IN OT) occurred between the workclamps. (Zero-return again.)	
2083	W. DOG TIMER (M82)	The M82 (work selector left) command is not completed within the specified time. (The limit switch may be abnormal, or the air pressure may be low.)	
2084	W. DOG TIMER (M83)	The M83 (work selector right) command is not completed within the specified time. (The limit switch may be abnormal, or the air pressure may be low.)	
2085	F. FREE BER. (OFF) LOWER LS	The front free-motion bearing table up solenoid valve turned off, but the lower end limit switch (FFBDP) did not turn on. (The limit switch may be abnormal.)	
2086	R. FREE BER. (OFF) LOWER LS	The rear free-motion bearing table up solenoid valve turned off, but the lower end limit switch (RFBDP) did not turn on. (The limit switch may be abnormal.)	
2087	EMERGENCY STOP BUTTON	One of the EMERGENCY STOP buttons is pressed.	
2088	WORKSHEET OUT OF POSITION	The worksheet is displaced from the workclamps.	
2089	DEAD ZONE	The punch was trying to punch where it may punch one of the workclamps. (Check the area around each workclamp. If there is no problem, press the PUNCHING button and then the START button.)	
2090	COOLANT OFF	The cooling unit is turned off.	

No.	Message	Description/Remedy	Remarks
2091	ALARM (PROCESSING CONDITION)	The upper end is set above the second top dead center.	
2092	PUSH S.D. RESET BUTTON	Press the SAFETY DEVICE & AIR DOWN RESET button.	
2093	M-CODE ERROR (PROCESSING CONDITION)	An undefined M-code or T-code was commanded. (Correct the punching program.)	
2094	AXIS EMERGENCY STOP	An axis emergency stop limit switch is tripped. (While pressing and holding the OT RELEASE button, move the axis in the opposite direction.)	
2095	CENTER FREE BER. (OFF) LOWER LS	The center free-motion bearing table is lowered, but the center free-motion bearing table down limit switch is turned off. (The limit switch may be abnormal.)	
2096	2ND F. FREE BER. (OFF) LOWER LS	The second free-motion bearing table is lowered, but the second free-motion bearing table down limit switch is turned off. (The limit switch may be abnormal.)	
2097	M00, M01 STOP	The machine was stopped by an M00 or M01 command.	
2098	AUTO-INDEX NOT ZERO-RETURNED	Since the auto-index is not returned to the origin, the turret cannot rotate. (Zero-return the C-axis.)	
2099	MP STOP	A stop signal is received from the manipulator.	
2100	P&F (DIE) LS (UPPER) NG.	M590 or M591 commanded the machine to raise the die, but the die lower end signal did not turn off within 3 seconds. Or M592 commanded the die to cycle once, but the die lower end signal did not turn off within 3 seconds. Or the forming cylinder was set and the IH controller was commanded to prepare for operation, but the die lower end signal did not turn off within 3 seconds.	
2101	P&F (DIE) LS (LOWER) NG.	The die (forming cylinder) up limit switch turned off, but the die lower end signal could not be detected. (The forming cylinder lower end proximity switch signal is abnormal.)	
2102	P&F (DIE) LS (SET) NG.	The die setting limit switch turned on, but the die setting limit switch turn-on signal could not be detected. (The setting cylinder forward end auto switch signal is abnormal.)	
2103	P&F (DIE) LS (RESET) NG.	The die setting limit switch turned off, but the die setting limit switch turn-off signal could not be detected. (The setting cylinder forward end auto switch signal is abnormal.)	

No.	Message	Description/Remedy	Remarks
2104	P&F M-CODE ERROR.	A ram operation M-code, M591 or M592, other than those for the forming mode, was commanded. (This is a program checking mistake.) (Correct the punching program.)	
2105	P&F T-CODE ERROR.	One of the M-codes M590 to M592 was commanded after a T-1xx code. Or a T-1xx was commanded after one of the M-codes M590 to M592. (Correct the punching program.)	
2106	PUNCH ERROR (PROCESSING CONDITION)	The punching force of the worksheet exceeds the maximum press capacity of the machine.	
2107	W. DOG TIMER (PRESS)	The ram has not returned to the upper end or top dead center after the punching operation. Or the operation with roller tooling or P&F operation is not completed in one cycle. Press the RESET key, and restart.	
2108	X AXIS MOTOR TEMP. WARNING	The X-axis motor temperature rose too high. (The press speed dropped to F2 or lower.)	
2109	Y AXIS MOTOR TEMP. WARNING	The Y-axis motor temperature rose too high. (The press speed dropped to F2 or lower.)	
2110	P&F IH CONTROLLER ALARM	An error occurred in the IH controller. (Press the RESET key to clear the alarm. If the alarm cannot be cleared, turn off the power of the IH controller (press the POWER OFF button, and turn the machine circuit breaker switch to OFF).)	
2111	W. DOG TIMER (P&F M-CODE)	The M-code command used for P&F is not completed within the specified time. (Press the START button to resume the operation. If the alarm cannot be cleared, press the RESET key.)	
2112	P&F IH COMMUNICATION ERROR (POWER OFF)	The forming M-code data communication was abnormal. Check the communication cable between the control panel and P&F IH controller, and turn on the power again.	
2119	TAP BROKEN	The tap broke during the tapping operation.	
2120	W. DOG TIMER (M282)	The M282 (workchute 1 upper end standby) command is not completed within the specified time. (The limit switch may be abnormal, or the air pressure may be low.) Check and reset the limit switches, solenoid valves, and mechanisms in the related operating parts.	

No.	Message	Description/Remedy	Remarks
2121	W. DOG TIMER (M283)	The M283 (guide cover upper end standby) command is not completed within the specified time. (The limit switch may be abnormal, or the air pressure may be low.) Check and reset the limit switches, solenoid valves, and mechanisms in the related operating parts.	
2122	WORKCHUTE 1 RAISE WD	The workchute 1 does not rise. (Check the workchute 1 upper end proximity switch or air pressure.)	
2123	WORKCHUTE 1 DESCENT WD	The workchute 1 does not lower. (Check the workchute 1 lower end proximity switch or air pressure.)	
2124	GUIDE BAR RAISE WD	The guide bar does not rise. (Check the guide bar upper end proximity switch or air pressure.)	
2125	GUIDE BAR DESCENT WD	The guide bar does not lower. (Check the guide bar lower end proximity switch or air pressure.)	
2126	WORKCHUTE 2 RAISE WD	The workchute 2 does not rise. (Check the workchute 2 upper end proximity switch or air pressure.)	
2127	WORKCHUTE 2 DESCENT WD	The workchute 2 does not lower. (Check the workchute 2 lower end proximity switch or air pressure.)	
2128	CHUTE ROLLER 2 RAISE WD	The workchute rollers 2 do not rise. (Check the workchute roller 2 upper end proximity switch or air pressure.)	
2129	CHUTE ROLLER 2 DESCENT WD	The workchute rollers 2 do not lower. (Check the workchute roller 2 lower end proximity switch or air pressure.)	
2130	CHUTE RAISE WD	The workchute stopped during its operation. (Check the proximity switch and other controls. The air pressure may be low.)	
2131	WORKCHUTE SENSOR WAS NOT DETECTED WD	The drop of a punched part down the workchute was not detected. (Check that the part is not jammed in the workchute.)	
2132	X AXIS MOTOR TEMP WARNING	The X-axis motor temperature exceeded the set point. (The press speed dropped to F2 or lower.)	
2133	Y AXIS MOTOR TEMP WARNING	The Y-axis motor temperature exceeded the set point. (The press speed dropped to F2 or lower.)	
2134	M13 NOT EXECUTED	M13 (press mode cancel) is not executed during forming with M590, M591, or M592. (Correct the punching program.)	

No.	Message	Description/Remedy	Remarks
2137	CLAMP LEVER HAS LOOSENED	The clamp lever of a workclamp loosened during automatic operation. (Retighten the clamp lever, and restart the automatic operation.) This alarm also occurs when the cable of the proximity switch for detecting the looseness of the clamp lever is broken. (Check the cable for continuity.)	
2139	MAXIMUM HIT RATE IS BEING RESTRICTED	Since the A-axis motor temperature has risen, the maximum hit rate is restricted.	
2140	WORKCHUTE SENSOR PRODUCT UNDETECTING	The workchute part unload confirmation sensor failed to confirm the drop of a part down the workchute. (Check that the part is not jammed in the workchute. If there is no problem, restart the operation.)	
2141	WORKCHUTE SENSOR ABNORMAL	The workchute part unload confirmation sensor is low in detection sensitivity. (Check the light emitter and receiver of the sensor for contamination, the sensor for installation position deviation, and the sensor amplifier for open or improper connection.)	
2153	WORKHOLD PS	The workhold pressure switch became abnormal. (The pressure switch may be abnormal, or the air pressure may be low.)	
2155	TOOL CHANGE SW	The TOOL CHANGE switch was turned during the rotation of the turret. (Press the RESET key, and change the tool again.)	
2156	ORIGIN RETRACT NOT COMPLETED	The zero-return is not completed.	
2157	PROGRAM CHECK MODE	The NC unit is in the program check mode.	
2158	AMNC ACTION SIGNAL OFF	The AMNC start signal is turned off.	
2159	PROGRAM FORWARD UNFINISH	The program is being transferred.	
2161	A-AXIS ELECTRON THERMAL ABNORMAL	The A-axis electronic thermal relay became abnormal.	
2162	A-AXIS AMPLIFIER THERMAL ABNORMAL	The thermal relay of the A-axis amplifier became abnormal.	
2163	A-AXIS MOTOR (A) THERMAL ABNORMAL	The thermal relay of the A-axis motor (A) became abnormal.	
2164	A-AXIS MOTOR (B) THERMAL ABNORMAL	The thermal relay of the A-axis motor (B) became abnormal.	
2165	A-AXIS MOTOR POLE ABNORMAL	The A-axis motor lost one phase.	

No.	Message	Description/Remedy	Remarks
2166	A-AXIS LOW VOLTAGE	The A-axis voltage is low.	
2169	A AXIS SERVO ALARM 1	An alarm occurred in the A-axis servo amplifier. (Check the LED display of the A-axis servo amplifier, and contact AMADA.) E08: Abnormal memory condition E10: Abnormal CT condition E15: Abnormal power supply condition of thyristor for projection prevention E20: Abnormal control power supply condition E22: Abnormal CPU condition 2 (communication error) E31: Abnormal power module condition E39: Encoder error (including time out) E40: Unmatched error E98: Abnormal connector connection between amplifiers	
2170	START SELECTION DISAGREEMENT	The START button in a position different from that of the START button selection keyswitch was pressed. (Change to the press side selection.)	
2171	CLAMP LEVER IS LOOSE	The clamp lever of a workclamp is loose. (Check that the workclamp clamp detection dogs are all turned on.) This alarm also occurs when the cable of the proximity switch for detecting the looseness of the clamp lever is broken. (Check the cable for continuity.)	
2172	AUTO POWER OFF INVALID (BATTERY)	Since the battery voltage of the NC unit or pulse coder is low, the automatic power-off operation cannot be performed. (With the power of the NC unit turned on, change the battery for a new one.)	
2173	MP AUTO POWER OFF	The power of the manipulator was automatically turned off. (To operate the machine standalone again, turn off the power of the manipulator.) (To use the manipulator again, turn on its power.)	
2174	CLAMP SETTING POSITION ABNORMAL	In the origin position, the workclamp read limit switch tripped the workclamp read dog. (Change the position of the workclamp concerned.)	

No.	Message	Description/Remedy	Remarks
2175	BRUSH UP TIME OVER	The brush up solenoid valve turned on, but the brush lower end limit switch did not turn off. (The limit switch may be abnormal, or the air pressure may be low.)	
2176	BRUSH DOWN TIME OVER	The brush up solenoid valve turned off, but the brush lower end limit switch did not turn on. (The limit switch may be abnormal, or the air pressure may be low.)	
2177	T. ALIGN SW	The machine is in the tool alignment mode. The power of the A-axis amplifier is being turned off. (To resume the punching operation, turn the TOOL CHANGE keyswitch to ON.)	
2179	CHECK TIME EXCESS WARNING	This warning message informs you that the current date has exceeded the inspection date set on the INSPECTION display in the maintenance displays. (Inspect and maintain the related component or components, and then press the COMPLETE button on the INSPECTION display.)	
2180	FENCE DOOR OPEN	The fence door is open. (Check that it is securely closed.)	
2181	PUSH RESET KEY AND REFERENCE REQUIRE	An alarm occurred during the tapping operation. (Press the CLEAR button on the maintenance display, and zero-return the machine.	
2182	APC BATTERY LOW (POWER MATE)	The APC battery is low in voltage. (Change the battery for a new one.)	
2183	NC BATTERY LOW (POWER MATE)	The Power Mate battery is low in voltage. (Change the battery for a new one.)	
2184	NC WARNING (POWER MATE)	An NC warning occurred in the Power Mate. Check it on the alarm display of the handy control panel.	
2185	NC ALARM (POWER MATE)	An NC alarm occurred in the Power Mate. Check it on the alarm display of the handy control panel.	
2186	SERVO ALARM (POWER MATE)	A servo alarm occurred in the Power Mate. Check it on the alarm display of the handy control panel.	
2187	TAP START BIT ABNORMAL	The tapping command is abnormal. (Press the RESET key, and do again.)	
2188	TAP PLATE OPEN	The tap plate is open. (Check that it is securely closed.)	
2189	PDC WARNING REPAIR MODE	The PDC is recovering from an error. Perform the error recovery operation of the PDC to clear the alarm.	

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No.	Message	Description/Remedy	Remarks
2190	PDC MDI PROGRAM MODE	The PDC is being set up in the MDI mode.	
2191	PDC PUNCH SET CONDITION CHECK	The PDC changed in the tool installation condition. Check the location of the tool concerned.	
2192	PDC ALARM	The PDC displayed an alarm. Remove the cause of the alarm in the PDC.	
2193	LINE STOP SW	The LINE STOP button is pressed.	
2194	PDC STAND-BY POSITION OFF	The PDC is not in the standby position. Perform the automatic standby operation of the PDC.	
2195	PDC DP (LOWER) STAND-BY POSITION OFF	The lower die pusher is not in the standby position. Operate the PDC to move the lower die pusher to the standby position.	
2196	NUMBER OF CLAMPS SETTING ERROR	The actual number of workclamps is different from the preset number of workclamps. Check the number of workclamps installed in the carriage, and enter the correct number.	
2197	CLAMP LEVER DETECTION CANCEL	The clamp lever looseness detection function is disabled. In this case, the position of the workclamps is read at the start of each program.	
2198	PDC CEXE COMMUNICATION_DATA ERROR	There is a communication data error between the CEXE of the machine and the CEXE of the PDC is abnormal (the communication cable id named IOPDC). Turn off the power, and then turn it back on.	
2200	PDC NOT READY	The PDC is not yet ready. Ready the PDC for operation.	
2201	PDC EMERGENCY STOP	The PDC is stopped in emergency. Remove the cause of the alarm to return the PDC to normal operation.	
2202	PDC WARNING STOP	The PDC displayed a warning. Remove the cause of the warning in the PDC.	
2203	BLOW THERMAL TRIP	The thermal relay of the magnetic switch for the slug suction blower motor tripped.	
2204	SCRAP BOX OPEN ABNORMALITY LS	The scrap box open solenoid valve turned on, but the open end limit switch did not turn on. (The limit switch may be abnormal, or the air pressure may be low.)	
2205	SCRAP BOX CLOSE ABNORMALITY LS	The scrap box close solenoid valve turned on, but the close end limit switch did not turn on. (The limit switch may be abnormal, or the air pressure may be low.)	

No.	Message	Description/Remedy	Remarks
2206	SUPPORT COVER RISE AND ABNORMALITY LS	The support cover rise solenoid valve turned on, but the upper end limit switch did not turn on. (The limit switch may be abnormal, or the air pressure may be low.)	
2215	PDC FENCE DOOR OPEN	The fence of the PDC is open.	
2216	PDC MAINTENANCE SW	The PDC is under maintenance.	
2217	TOOL CHANGE POSITION (TURRET)	An attempt was made to punch while the tool change turret of the PDC was being positioned.	
2218	AIR BLOW-V OIL LEVEL IS LOW	The oil level of air blow unit type V is low. Add.	
2219	PDC OFF-LINE	The PDC is off-line. Check the ON-LINE/OFF-LINE switch on the CC pendant.	
2220	EMERGENCY STOP BY CENTER X-GAUGE BLOCK RISE	The center X-gauge block was raised when the X- and Y-axes were out of the loading or unloading position. The center X-gauge block is likely to interference with one of the workclamps. Lower it.	
2221	TAP TURRET NEED ZERO-RETURN	Zero-return the tap turret.	
2222	IT CAN RE-START BY THE START BUTTON OF OPERATION STAND	When NC start or schedule start was initiated from a peripheral unit, the machine entered an alarm condition. The machine can be restarted by pressing the START button on the main control panel.	
2223	SCHEDULE NUMBER-OF-SHEETS END	The number of worksheets already processed has reached the number of worksheets to be processed. Reset either number to 0 to clear the message. The message can also be cleared by manually setting the number of worksheets to be processed larger than the number of worksheets already processed. The program operation cannot start while the message is displayed.	
2224	GREASE EXCHANGE TIME OF AUTOMATIC GREASE LUBRICATOR	The automatic grease lubricator is low on grease. Check the grease level. Change the grease cartridge if necessary. (After the grease cartridge change, be sure to select the item of the automatic grease lubricator grease level [%] on the INSPECTION display and press the COMPLETE button.)	

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No.	Message	Description/Remedy	Remarks
2233	W. DOG TIMER (M31) (This alarm applies to pilot pin specification.)	M31 (pilot pin) command is not completed within the specified time. Either of the following two series of motions is not completed within the specified time: M31 is commanded → Pilot pin lowers → Pilot pin stops at intermediate position → Workclamps open → Pilot pin lowers → Pilot pin stops at lower end → Workclamps close → Pilot pin rises to upper end – Procedure is completed The limit switches may be abnormal, or the air pressure may be low. Check the following limit switches and solenoid valves: Pilot pin upper end, intermediate position and lower end limit switches, and pilot pin lower and rise solenoid valves.	
2234	U AXIS NOT ZERO-RETURNED	The U-axis is not zero-returned. (Zero-return it again.)	
2235	V AXIS NOT ZERO-RETURNED	The V-axis is not zero-returned. (Zero-return it again.)	
2236	PROGRAM SEARCH IS NOT COMPLETED	A self-diagnostic program or punchig program is being searched for.	
2237	NEGATIVE PRESSURE IS LOW	The vacuum effect is not obtained. (The ring blower or packing may be abnormal.)	
2238	IT CAN NOT RESUME	Refer to the RESUME button on the PROGRAM display in Part III.	
2239	RESUMPTION IS READY	The machine is ready for resuming the interrupted operation. (Press the START button to resume the interrupted operation.)	
2240	P&F DIE UPPER INPOSITION OFF	The die is not raised to the preset upper inposition. (Check the parameter settings of the forming M-code used.)	
2241	P&F DIE LOWER INPOSITION OFF	The die is not lowered to the preset lower inposition. (Check the parameter settings of the forming M-code used.)	
2242	MULTIPLE-PART PUNCHING SETUP BUTTONS	When the LINE MODE switch is turned to ON, the three multiple-part punching setup buttons are all extinguished, or the FIRST PART button is illuminated. (Recheck which multiple-part punching setup button is pressed.)	
2307	LINE SW ON OR AUTO SW OFF	The AUTO ON/OFF keyswitch is turned to OFF or the LINE ON/OFF keyswitch is turned to ON when the Clamp Positioning display is opened. (Turn the AUTO ON/OFF keyswitch to ON, or turn the LINE ON/OFF keyswitch to OFF.)	

No.	Message	Description/Remedy	Remarks
2308	CLEAN THE SUCTION FILTER	The suction filter was cleaned four times, but the negative pressure value created by the blower motor did not drop below the upper limit pressure value for cleaning the suction filter. (The suction filter or filter box may be clogged, or the negative pressure adjusting mechanical valve or pressure sensor may not be adjusted properly.)	
2309	BLOWER MOTOR OVER PRESSURE	The negative pressure value created by the blower motor exceeded the upper limit excessive negative pressure value. (The suction filter or filter box may be clogged, or the negative pressure adjusting mechanical valve or pressure sensor may not be adjusted properly.)	
2310	SUCTION FILTER CLEANING	The negative pressure value created by the blower motor exceeded the upper limit pressure value for cleaning the suction filter. Stop the machine axes and blower motor, and clean the suction filter. After the filter cleaning, the machine automatically resumes its operation. (If the suction filter is cleaned frequently, the suction filter or filter box may be clogged, or the negative pressure adjusting mechanical valve or pressure sensor may not be adjusted properly.)	
2317	SUCTION SENSOR ABNORMAL	The blower motor is stopped, but the negative pressure value created by the blower motor does not drop. (The pressure sensor may not be adjusted properly.)	
2318	LINE MATERIAL HANG DOWN	The worksheet dropped or was about to drop during standby for pickup in the line. (For details, refer to the operator's manual of the line.)	
2319	LINE NCT ABNORMAL	The machine exceeded the time limit between the start of processing and the end of processing. (For details, refer to the operator's manual of the line.)	
2320	PC FREE MEMORY DECREASE WARNING	The PC memory usage exceeded 90%. (Restart the machine.)	
2321	PC FREE DISK DECREASE WARNING	The PC data disk usage exceeded 90%. (Secure free space in the drive G.)	
2324	START CONDITION DISAGREEMENT	The start conditions did not match in the MP remote schedule operation specification. The MP remote schedule operation specification does not allow the MP to start automatically in operation modes other than the single program operation and MP remote schedule operation modes.	

No.	Message	Description/Remedy	Remarks
2327	TAP BROKEN SENSOR ABNORMAL	The tap breakage sensor is not in contact with the worksheet, but is not insulated. Contact AMADA.	
2328	TAP DEAD ZONE	The tap is likely to interfere with one of the workclamps. (Check that the tap is not likely to interfere with any of the workclamps. If no problem is found, press the PUNCHING button and then the START button.)	
2329	TAP PROCESSING SKIP	The tapping function detected a broken tap during the tapping operation. Worksheets are not processed with the broken tap. (When this message is displayed, go to the Hit count management display for TAP through the MAINTENANCE 1 display, check the tap station information to find which tap is broken, and change the broken tap.) (After changing the broken tap, press the CLEAR button on the Hit count management display for TAP. In this case, the hit count is also cleared.)	
2331	POWER-OFF IS BEING EXECUTED	The automatic power-off operation is being performed.	
2900	LINE INTERRUPT	The interrupt operation is being performed in the line. (This alarm message appears, for example, when the worksheets or parts are being changed.)	
2901	LINE ABNORMAL	The line became abnormal. (This alarm message appears when the line cannot resume its operation or the line is stopped in an emergency. For details, refer to the operator's manual of the line.)	
2902	LINE STOP	The line is in the stop condition (a stop condition alarm is included). (For details, refer to the operator's manual of the line.)	
2903	LINE NO MATERIAL	There is no more worksheet. (Add worksheets.) (For details, refer to the operator's manual of the line.)	
2904	LINE SHEET PICK UP FAILED	The line failed to pick up the worksheet. (For details, refer to the operator's manual of the line.)	
2905	LINE TWO SHEET DETECTED	The line picked up two or more worksheets at a time. (For details, refer to the operator's manual of the line.)	
2906	LINE ORIGIN SET FAILED	The line failed to set the worksheet at the origin. (For details, refer to the operator's manual of the line.)	

No.	Message	Description/Remedy	Remarks
2907	LINE ORIGIN SENSOR ABNORMAL	The line origin sensor became abnormal.	
2908	LINE UNLOADING FAILED	The line failed to unload the parts. (For details, refer to the operator's manual of the line.)	
2909	LINE PILING OVER	The autostorage became full. (Remove the worksheets from the shelves of the autostorage.) (For details, refer to the operator's manual of the line.)	
2910	LINE PROCESS TIME OVER	The line took longer than specified processing time. (For details, refer to the operator's manual of the line.)	

(13) CUSTOM MACRO ALARMS

No.	Message	Description/Remedy	Remarks
3004	T-CODE FORMAT ERR.	The T-code command is wrong. Press the RESET key, and check the program.	PDC
3005	ATC OFF LINE	The T-code is specified in seven digits, but the ATC is off-line. Press the RESET key, and check the program.	PDC
3018	G18 PROGRAM ERROR	The G18 command has an improperly specified value.	TK
3024	G06 PHNC FIN ERROR	The G06 command has no response from the press axis control (CEXE) indicating its completion. Reset the line, and execute the punching program again.	
3025	G06 DATA ERROR	The G06 command has the value of A or B improperly specified as follows: The thickness (A) is less than 0.4 mm or is 6.5 mm or more. The material (B) is other than 0, 1, or 2. The value of the thickness (A) or material (B) is not specified.	
3050	G10 G10 X INPUT ERROR	The G10 command has the X dimension of the worksheet improperly specified.	
3053	RACK NO. INPUT ERROR	The shelf number in schedule operation is "0" or not specified.	
3054	G18	The G18 command has an improperly specified value.	PX
3055	G10 BELOW THE LOWER LIMIT	The G10 command has the X dimension of the worksheet specified less than the minimum value. Press the RESET key, and check the program.	
3056	LINE DEVICE NOT SELECT G10	Parameters for line device selection are not set. Check the setting off parameters.	
3057	G80 X, Y INPUT ERR. G80 P, Q INPUT ERR. G80 I, J, K INPUT ERR.	G80: Used for a marking tool at the 2" auto-index station G81: Used for a marking tool at the 1-1/4" auto-index station The value of X, Y, P, Q, I, J, or K is improperly specified.	Marking tool
3058	TAPPING ERR	Tap turret discrimination processing failed.	Tap (automatic change)

No.	Message	Description/Remedy	Remarks
3059	THERE IS NO SPARE TAP	There is no spare tap to be used for automatic change of a broken tap. There is no spare tap to be used for automatic change of a tap coming to the end of its useful life.	Tap (automatic change)
3060	REPOSITIONING ERROR G10	The reposition amount specified by X exceeds the offset amount.	High-speed ASR/ High-speed /LUL
3061	G10 NOT SAME G05 WORK SIZE	The G05 command and the G10 command do not have the same value of X.	High-speed ASR/ High-speed /LUL
3062	TAPPING ERR	Tap turret discrimination processing failed.	Tap (automatic change)
3080	OTHER ERR. NO. SET	Error other than macro alarms 3150 to 3161 and related to seven-digit T-number processing. Check the processing program, tool data and machine condition, and turn off the power and then turn it back on.	PDC
3083	G15 PROGRAM ERR	The G15 command has the value of X not specified.	PX
3084	G16 PROGRAM ERR	The G16 command has the values of X, Y, I, J or M not specified, or involves punching with the value of Y specified at 40 mm or less.	PX
3091	CLAMP POSITION ERROR	The G92 command has the position of the workclamps measured, but the X coordinate of the installation position of one workclamp is 0 mm. Recheck the installation position.	
3092	MEASUREMENT ERROR	The G92 command has the position of the workclamps measured, but the X coordinate of the installation position of the workclamps is outside of the range of 0 to 2500 mm. Or the difference in the values measured across each workclamp is improper. Recheck the installation position.	
3093	DATA TRANSFER ERROR	The G92 command failed to set the workclamp coordinates (or write them into the applicable parameters). Reset the line, and execute the punching program again.	

No.	Message	Description/Remedy	Remarks
3094	CLAMP INTERVAL ERROR	When the position of a workclamp was measured as commanded by G92, its coordinate position difference from the adjacent workclamp was not correct. (Recheck its installation position.)	
3095	CLAMP WIDTH ERROR	When the width of a workclamp was measured as commanded by G92, it was not correct. (Check that the workclamp is properly installed.)	
3133	X, Y INPUT ERR	The G05 command has the value of X that is "0" or not specified.	X-shuttle
3135	PROGRAM G05	The machine is not equipped with the clamp positioner, but the G05 command is specified in the program, or the AUTO ON/OFF keyswitch is set to OFF.	Clamp positioner
3136	CLAMP POSITIONING ERROR	The errors between the I and J values of the G05 command and the workclamp position readings are excessive. Zero-return and restart the machine.	Clamp positioner
3137	I, J, K INPUT ERROR	The G05 command has the valve of I or J not specified or has the value of I, J or K specified exceeding the limit.	Clamp positioner
3138	CLAMP POSITIONING ERROR	The errors between the I and J values of the G05 command and the workclamp position readings are excessive. Zero-return and restart the machine.	Clamp positioner
3150	TURRET STATION NO. ERR.	A nonexisting turret station number was specified. Press the RESET key, and check the program.	PDC
3151	STORAGE STATION NO. ERR.	A nonexisting storage station number was specified. Press the RESET key, and check the program.	PDC
3152	TOOL RANGE ERR.	The tool range of the specified machine turret station does not agree with that of the specified storage turret station. Press the RESET key, and check the program.	PDC
3153	STORAGE DIE NO. ERR.	A nonexisting storage die number was specified. Press the RESET key, and check the program.	PDC
3154	A BREATHING TOOL ERR.	Data alone is registered, and the tool itself is temporarily removed from the machine. Install the tool specified in the processing program in the machine, and clear the temporary removal condition.	PDC

No.	Message	Description/Remedy	Remarks
3155	WRONG STATION NO.	The storage station number specified by a seven-digit T number is set unusable. If the station is unusable, change the processing program. If the station is usable, clear its unusable setting.	PDC
3156	ASK PERMISSION TO USE THIS STATION NO.	The storage station number specified by a seven-digit T number is set not to be used. Ask the manager if the station can be used. If the station is not to be used, change the processing program. If the station is to be used, clear its not-to-use setting.	PDC
3157	RESERVED TURRET STATION NO. ERR.	A tool that cannot be automatically changed is specified to be fixed in the turret, but the tool specified by a seven-digit T number need to be automatically changed. If the tool must be fixed in the turret, change the processing program. If the tool need not be fixed in the turret, clear its fix-to-the turret setting.	PDC
3158	NO ENTRY TOOL ERR.	The storage station number specified by a seven-digit T number has no tool data registered. Register the tool data (e.g., shape, size, and clearance) for the storage station.	PDC
3159	NO ENTRY DIE ERR.	The storage station number specified by a seven-digit T number does not have the tool data, especially the clearance, registered. Register the tool data, especially the clearance.	PDC
3160	THIS STATION NO. IS NOT T-AXIS NO.	The machine turret station number specified by a seven-digit T number is that of a station without T-axis control. Correct the processing program to change the number to that of a station with T-axis control.	PDC
3161	DISHONESTY STATION NO. ERR.	The station number specified by a seven-digit T number is an unprocessable number. Correct the processing program to command a number that meets the seven-digit T-number specification.	PDC

(14) HMI ALARMS

Error code	Error message	Cause and remedy
99	Cannot execute. Please cancel background edit mode.	The CNC unit is placed in the background edit mode. Clear the background edit condition by using the Fanuc CNC display functions.
		A P/S or BP/S alarm occurred. Press the RESET key to clear it.
		The CNC unit is placed in the MDI mode. Change the NC operating mode to MEMORY on the main control panel.
		An internal error occurred in the AMNCF application. Turn the power on again (restart the CNC unit).
105	Cannot execute. There is no 0001 or 9030 in CNC memory or ¥.	The number 9030 is not pre-registered in the CNC memory and cannot be searched for as dummy.
		There is a colon (:) in the middle of the program. Delete the colon.
		The CNC unit is placed in the background edit mode. Clear the background edit condition by using the Fanuc CNC display functions.
		A P/S or BP/S alarm occurred. Press the RESET key to clear it.
		For some reason, O0001 cannot be written to the CNC memory and cannot be searched for.
107	Cannot execute. Release edit protection.	The memory protection function is enabled. Turn the EDIT PROTECT keyswitch to OFF.
108	Cannot execute. Because the program is too large¥.	The program capacity has exceeded the free capacity of the CNC memory.
		Check the CMC Maintenance display to see if there are any unnecessary programs in the CNC memory.
112	Cannot execute. Change the mode to [MEM].	The program has been transferred in an NC mode other than MEMORY. Change the NC mode to MEMORY on the main control panel.
113	Cannot execute. CNC alarmed.	The CNC unit is not normally started.
		The CNC unit and surrounding hardware may be abnormal.
124	Cannot execute. Could not import the file. A temporary file may have been damaged.	The file may be damaged.
		Read the program again from the original media, and overwrite the temporary file with the program.
		If the alarm cannot be still cleared, scan the system drive.

Error code	Error message	Cause and remedy
125	Cannot execute. Could not open the file. A temporary file may have been damaged.	The file may be damaged. Read the program again from the original media, and overwrite the temporary file with the program. If the alarm cannot be still cleared, scan the system drive.
126	Cannot execute. The transferred program could not be selected as an operation program. Please check the mode.	The program has been transferred in an NC mode other than MEMORY. Change the NC mode to MEMORY on the main control panel. There is a colon (:) at the beginning of the program. Delete the colon.
128	Cannot execute. The subprogram no. is outside the 2-99 range.	In the subprogram specified in the same file as the main program, the four-digit value following the O number is outside the range of 2 to 99.
129	Cannot execute. Please invalidate the TV check.	The CNC setting parameter No. 0000#0<TVC>TV check is enabled. Disable the TV check by using the Fanuc CNC display functions.
161	Cannot execute. It is either being run or has been stopped/suspended.	The operation cannot be executed during automatic operation, including the suspended and stopped conditions. Execute the operation after the completion of automatic operation or by pressing the RESET key.
163	Cannot execute. Change to schedule or program operation.	The operation cannot be executed in an automatic operating mode other than SCHEDULE or PROGRAM. Change the mode to SCHEDULE or PROGRAM.
164	Cannot execute. Please invalidate the TV check.	The CNC setting parameter No. 0000#0<TVC>TV check is enabled. Disable the TV check by using the Fanuc CNC display functions.
165	Cannot execute. Performing emergency stop.	The operation cannot be executed during emergency stop. Execute it after clearing the emergency stop.
166	Cannot execute. The program name includes the following invalid characters ¥n()!~|^¥¥`{}_	Change the program name. The following characters cannot be used: Left parenthesis "(" Right parenthesis ")" Exclamation mark "!" Tilde "~" Pipe "|" Hat "^" Currency symbol "¥" (Back slash "\" in English) Back quote "`" Left brace "{" Right brace "}"

Error code	Error message	Cause and remedy
167	Cannot execute. CNC alarmed.	The operation cannot be executed when a CNC alarm is produced. Clear the CNC alarm before executing the operation.

A CNC alarm is different from a PMC operator message in that it is detected by the CNC unit itself. |
| Other error code | Cannot execute. | An unexpected error in the AMNCF application or Fanuc FOCAS1 library. |

(15) BIOS MESSAGES

When the power is turned on, the PANEL i runs a power-on self test. When an error is detected, a BIOS message, such as the one shown below, is displayed on the screen.

Example

```
Phoenix BIOS 4.0 Release 6.0
Copyright 1985-2002 Phoenix Technologiesb Ltd.
All Right Reserved

FANUC BIOS, 6150/03
Copyright 2002 FANUC LTD.
All Right Reserved

CPU= Intel(R) Celeron(TM) Processor 733MHz
639K System RAM Passed
125M Extended RAM Passed
0128K Cache SRAM Passed
System BIOS shadowed
Video BIOS shadowed
        CMOS Battery Failure
        **System Stopped by Temperature/Fan/Battery Alarm. Turn Off the Power.**




Press ＜F2＞  to enter  SETUP
```

Error code	BIOS message	Cause and remedy
	CPU Temperature Exceeds the Upper Limit - FATAL	The CPU temperature is too high. The radiator fins may not be in correct contact with the CPU.
	Ambient Temperature Exceeds the Upper Limit – FATAL	The ambient temperature is too high. Heat radiation in the cabinet may not be properly performed.
	CPU Fan Failure. – FATAL	The 60 mm square base unit fan is stopped.
	Case Fan Failure	The 40 mm square base unit fan is stopped.
	CMOS Battery Failure	The battery in the PANEL i is disconnected or run down.
0200	Failure Fixed Disk	The hard disk cannot be correctly recognized.
0210	Stuck Key	The keyboard is improperly operated. Check that no keys on the keyboard are stuck.
0211	Keyboard Error or not Connected	The keyboard is faulty. Check that it is properly connected.
0251	System CMOS checksum Bad - Default Configuration used.	Since the CMOS data* was not properly checksummed, the system started with default settings.
0271	Check data and time setting	The date and time are incorrectly set. (This occurs when the power supply from the battery is stopped). Set the correct date and time with the BIOS or OS setup function.

Error code	BIOS message	Cause and remedy
0280	Previous boot incomplete - Default Configuration used.	Since the system did not normally start previous time, it starts with default settings.

*The CMOS data refers to the BIOS settings backed up by the battery.

(16) OTHER MESSAGE

Code	Message	Cause and remedy
	Under hit rate regulation	The hit rate may be regulated, depending on the load applied to the press drive motor for a certain period of time during the operation. While this message is displayed, the hit rate is regulated. (Check that the circumferential length of the cut is set appropriately.)

Part VIII

Maintenance

⚠ **WARNING**	● **Before maintaining the machine, turn off the shop circuit breaker switch, shut down the compressed air supply, and appropriately relieve the residual air pressure.**
	If compressed air and electric power are needed, prevent the machine from being started by mistake. Turn the SAFETY DEVICE keyswitch to SETTING, remove the key from the switch, and keep it by yourself.
	● **Post a sign to notify other workers that the machine is being serviced.**
	● **Before maintaining the machine with the machine circuit breaker switch turned to OFF, padlock the switch in the OFF position to prevent other workers from turning on the power of the machine by mistake.**
	● **When maintaining the machine with the knob of the residual pressure relief valve turned to "EXH.", padlock the knob in the "EXH." position to prevent other workers from supplying compressed air to the machine by mistake.**

___NOTE___

● The machine has the following maintenance accessories:
   FANUC OPEN CNC Windows XP Embedded Recovery Disk, AMNC03 application
   CD-ROM, and parameter/custom macro floppy disks
   You need them when you try to restore the machine after correcting a problem.   Store
   them carefully.   If you lose any one of them, you will be asked to purchase it again.

(For contents, refer to next page.)

VIII-2

DAILY MAINTENANCE

Perform the following daily inspection before starting the day's work.

- Check that the following parts are free of foreign matter, and remove it if there is any foreign matter.

    X-axis guide bar

    Side and center tables and free motion bearings

    Front and rear Y-axis guide bars

    Turret index pins and their holes

    Upper turret disk and punch heads

    Lower turret disk

- Lubricate the following parts.   See "Lubrication" for lubrication points.

    Workclamps

    Turret index pin holes

    Turret chain

    Punches

    Turret lifter collars

    Recommended lubricants: Exxon Teresstic 33, Mobil DTE Oil
                                            Light, Shell Tellus Oil 32

- Check the air filter of the air pressure control unit and the air compressor, and drain water from them if there is any accumulation of water.

- Check the oil level in the lubricator of the air pressure control unit, and add the oil if the level is low.   The level should be above the line marked on the lubricator.

    Recommended lubricants: Exxon Teresstic 33, Mobil DTE Oil
                                            Light, Shell Tellus Oil 32

- Check the air pressure on the pressure gauge of the air pressure control unit by opening the air intake valve.   The pressure should be 0.5 MPa (5.0 kgf/cm^2 or 72 psi).   Adjust the air pressure by turning the knob of the pressure regulator.   If the required air pressure is not obtained, check the air compressor and air line, and correct the condition.

- Check the air system piping for leaks and damage.   If the piping leaks or is otherwise damaged, correct the condition.

- Check that the tools are firmly installed.   Correct the tool installation condition if necessary.

- Check that the EMERGENCY STOP buttons work properly.

- Check that the turret cover (plastic) is not damaged.

Checking refilling

The ram and crankshaft are automatically grease lubricated. Check the grease level of the grease cartridge, and change the grease cartridge if it is low in grease.

NOTICE

● If the machine is operated with an empty grease cartridge, a lubrication alarm may occur and stop the machine.

The automatic grease lubricator is located in the cover at the T-axis motor side of the machine (or at the electrical control cabinet side). Before checking the grease level of the grease cartridge or changing the grease cartridge, remove the cover. For the procedure for changing the grease cartridge and the specified grease, refer to "Automatic grease lubricator" later in this Part.

Location of automatic grease lubricator

Remove the circled cover to reveal the automatic grease lubricator as shown below.

T-axis motor side of machine

Automatic grease lubricator

KNURLED
HEAD SCREWS
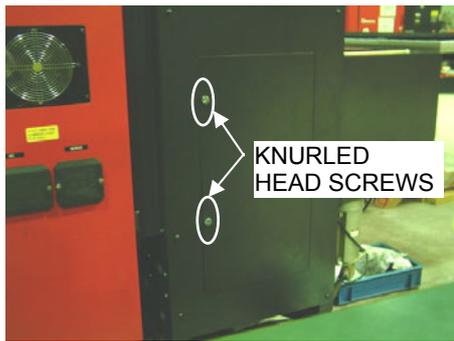
Checking reservoir tray

The ram and crankshaft are automatically grease lubricated by the automatic grease lubricator.   The used grease collects in the reservoir tray.

When changing the grease cartridge, be sure to remove the reservoir tray and clean it of the collected used grease.

NOTICE

● Unless removed from the reservoir tray, the used grease overfills the reservoir tray and drips down onto the brush table.   Before changing the grease cartridge, be sure to check the reservoir tray and clean it of the used grease.

NOTE

● When the machine is initially started, the grease takes some time to reach the reservoir tray due to the piping route.

For the procedures for removing the reservoir tray and cleaning it of the used grease, refer to "Cleaning reservoir tray of used grease" on page VIII-31.
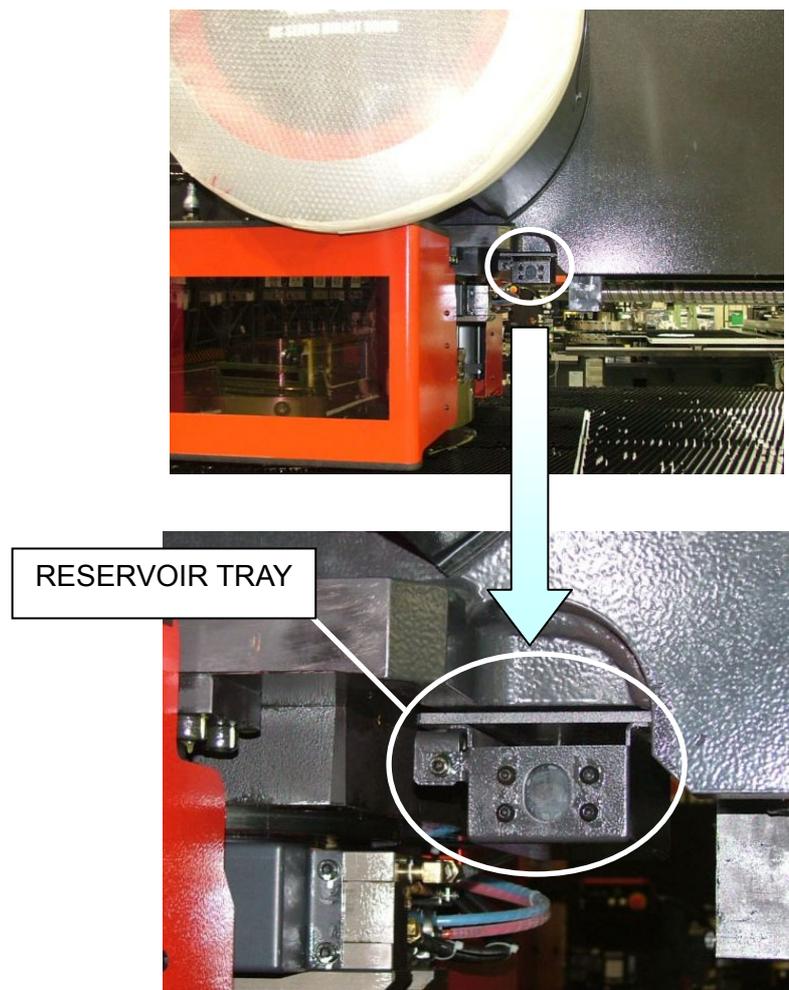
RESERVOIR TRAY

Location of reservoir tray (front of machine)

PERIODICAL MAINTENANCE

Every week

Inspect and maintain machine parts every week as described below as well as according to other periodical maintenance programs.

Tool change door interlock

Open the upper and lower tool change doors, and check that the STOP button on the main control panel is illuminated.

Air lubricator

Check the lubricator of the air pressure control unit for the frequency of oil drops, and regulate the frequency as required:

One drop per 5 in-and-out operations of the turret index pins

Turn the lubricator adjustment screw clockwise to decrease the frequency or counterclockwise to increase it.

AIR PRESSURE CONTROL UNIT

ADJUSTMENT SCREW

RESIDUAL PRESSURE RELIEF VALVE (LOCKOUT VALVE)

PRESSURE GAUGE

PRESSURE GAUGE (FOR AJV)

AIR INTAKE

AIR FILTER

AUTO DRAIN OUTLETS

MIST SEPARATOR

PRESSURE REGULATOR

LUBRICATOR

PRESSURE REGULATOR (FOR AJV)
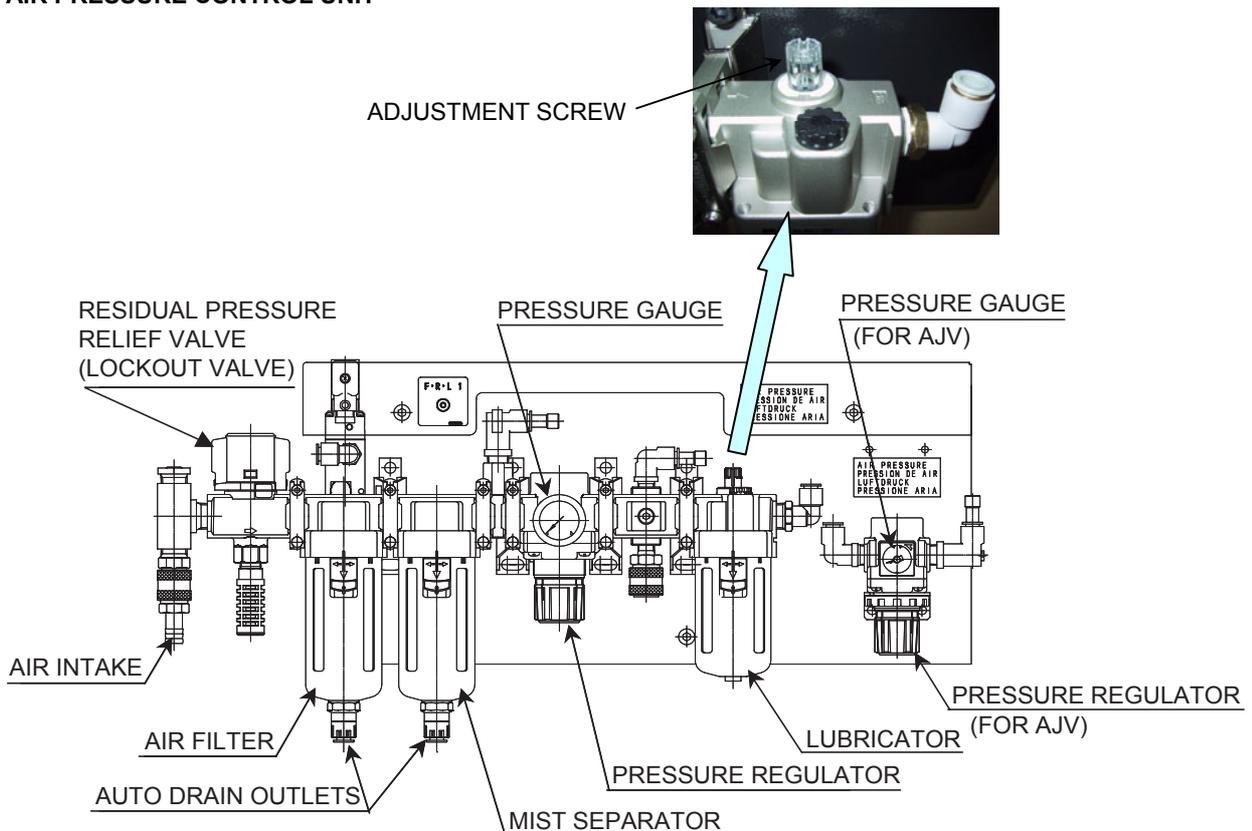
Every month

Inspect and maintain machine parts every month as described as well as according to other periodical maintenance programs.

Lubrication

Lubricate the following machine parts.   See "Lubrication" for their locations and recommended lubricants.

X-axis ball nut	Upper/Lower worm axes	LM guides under table
Y-axis ball nut	Holder/Die rotation	
Striker	X-axis guide nut	
Upper/Lower turret index pins	Y-axis guide nut	

Electrical control cabinet air filter

Remove the air filter from the lower rear of the electrical control cabinet by removing the two screws, and clean the filter by blowing compressed air on its inside surface.   If the filter is heavily covered with dust, immerse it in water mixed with synthetic detergent (2 to 4 g per liter of water) for several minutes, wash it by rubbing, rinse it, and dry it in the shade.
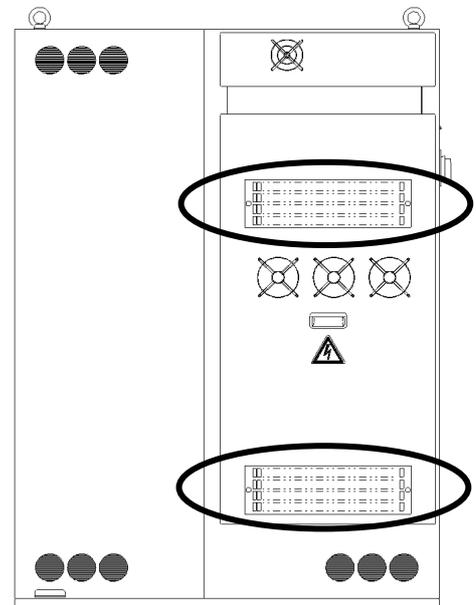
Cleaning amplifier box air filter

The air filter in the air inlet at the rear of the amplifier box can be clogged with dust as it is used.   Clean the air filter as described below

1   Press the POWER OFF button.

2   Turn the machine circuit breaker switch to OFF.

3   Slide sideways the air filter at the rear of the amplifier box installed below the rear table, and remove it through the air inlet.

SLIDE
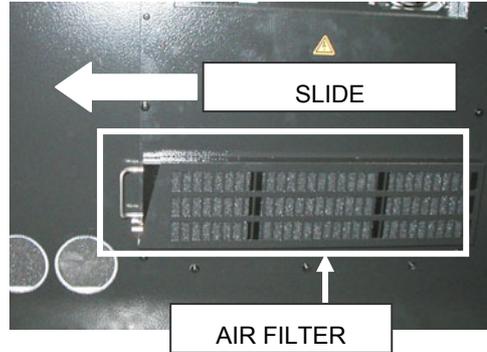
AIR FILTER

4   While lightly shaking the air filter, blow off the dust deposited on the air filter with compressed air from the back of the air filter (or its inside when installed).

5   If the air filter is very dirty, soak it in a synthetic detergent solution (2 to 4 g/L) for 5 min or more, and knead it in the solution.

NOTICE

● Do not wring the air filter.   After washing it, let it dry in the shade.

6   Install the air filter in the air inlet.

NOTICE

● Check that the air filter is securely installed.

Every 3 months

Inspect and maintain machine parts every 3 months as described below as well as according to other periodical maintenance programs.

Lubrication

Lubricate the following machine parts.   See "Lubrication" for their locations and recommended lubricants.

Upper turret drive chain   Lower turret drive chain

Y-axis gearbox

Every 6 months

Inspect and maintain machine parts every 6 months as described below as well as according to other periodical maintenance programs.

Electrical wiring

Check the grounding and other cable conductors for loose connections.

Every 12 months

Inspect and maintain machine parts every 12 months as described below as well as according to other periodical maintenance programs.

Backup batteries

Change the backup batteries installed in the electrical control cabinet as described below.   These batteries are used to maintain the programs and parameters stored in the memory when the NC unit or A-axis is turned off.   If they are consumed, the programs and parameters stored in the memory will be lost entirely.   In addition to their change every year, the batteries must also be changed whenever a battery alarm has occurred.

NC backup batteries

When the NC backup batteries drop in voltage, the alarm message "2007 BATTERY" appears on the screen.   Change the batteries as described below.

 (Two AM1 alkaline-manganese dry batteries)

⚠ WARNING	● The following procedure is hazardous. Have a qualified electrician carry out the work.

NOTICE

● Be sure to turn on the NC unit during the following procedure.   Otherwise the programs and parameters stored in the memory will be lost when the batteries are not changed within thirty minutes.

1 Before removing the batteries, turn the electric power on.

2 Remove the cover from the battery compartment in the front of the electrical control cabinet by removing the screws.

3 Remove all the old batteries from the compartment, and set the new batteries according to the polarity markings inside the compartment.

4 Replace the cover, and clamp it with the screws.

5 Check that the alarm message is cleared.

Absolute pulse coder backup batteries

When the absolute pulse coder backup batteries drop in voltage, the alarm message "2002 BATTERY (SERVO)" appears on the screen. Change the batteries as described below.

(Four AM1 alkaline-manganese dry batteries)

⚠ WARNING	● **The following procedure is hazardous. Have a qualified electrician carry out the work.**

<u>NOTICE</u>

● Be sure to turn on the absolute pulse coder during the following procedure. Otherwise the programs and parameters stored in the memory will be lost when the batteries are not changed within thirty minutes.

● When the alarm message "2002 BATTERY (SERVO)" appears on the screen, either the voltage drop of the batteries for the T-axis, C-axis, optional U-axis or optional V-axis, or the voltage drop of the drive axis origin maintaining battery may be responsible. Change all batteries.

1. Before removing the batteries, turn on the electric power.

2. Remove the cover from the battery compartment in the front of the electrical control cabinet by removing the screws.

3. Remove all the old batteries from the compartment, and set the new batteries according to the polarity markings inside the compartment.

4. Replace the cover, and clamp it with the screws.

5. Check that the alarm message is cleared.

Drive axis origin maintaining battery

⚠ WARNING	● Changing the battery is very dangerous. Be sure to ask AMADA to perform the work.

When the drive axis origin maintaining battery drops in voltage, the alarm message "2002 BATTERY (SERVO)" appears on the screen. Change the battery as described below.

(One Toshiba ER6V C4 lithium battery)

⚠ WARNING	● The following procedure is hazardous. Have a qualified electrician carry out the work.

NOTE

● Be sure to turn on the power of the NC unit during the following procedure. Otherwise the programs and parameters stored in the memory will be lost.

● When the alarm message "2002 BATTERY (SERVO)" appears on the screen, either the voltage drop of the batteries for the T-axis, C-axis, optional U-axis or optional V-axis, or the voltage drop of the drive axis origin maintaining battery may be responsible.   Change all batteries.

1   Turn the machine circuit breaker switch to ON.

2   Press the POWER ON button.
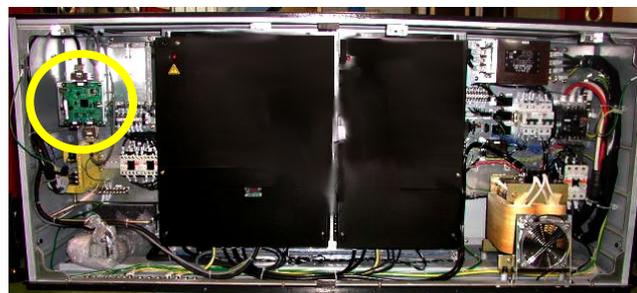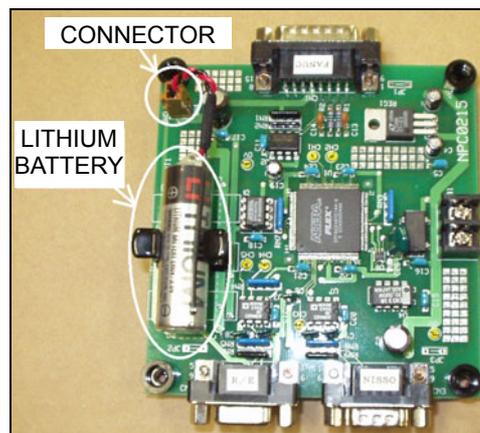
3   Turn the SAFETY DEVICE keyswitch to SETTING.

4   Open the front door of the amplifier box installed below the rear table.

5   Remove the battery from the holder in the encoder interface
    board.

6   Plug the connector of the new battery, and install the new battery
    in the holder.

7   Close the front door of the amplifier box.

8   Check that the alarm message "2002 BATTERY (SERVO)" is not
    shown on the screen.   If it is, press the RESET key to clear it.

9   Turn the SAFETY DEVICE keyswitch to OPERATION.

NOTICE

● When the alarm message "2002 BATTERY (SERVO)" appears on the
  screen, either the voltage drop of the batteries for the T-axis, C-axis, optional
  U-axis or optional V-axis, or the voltage drop of the drive axis origin
  maintaining battery may be responsible.   Change all batteries.

CLEANING FLOPPY DISK DRIVE HEAD

Contamination of the floppy disk drive head causes data reading error, for example. Clean the head to remove all of its contamination as described below.

1 Apply about five drops of cleaning solution to the opening in the white surface of the cleaning disk.

2 Insert the cleaning disk into the floppy disk drive.

3 Press the OPEN button to show a program list display on the screen, and press the media selection FD button.

   The access LED of the floppy disk drive illuminates.

4 The access LED extinguishes, and the message "Cannot import the data. Check that the FD has been inserted correctly" appears on the screen.

5 Press the eject button to remove the cleaning disk from the floppy disk drive.

6 Write down to the cleaning disk the number of times it has been used.

   _____
   NOTE
   _____

   ● To prevent the floppy disk drive head from being contaminated again, use the cleaning disk a maximum of 10 to 15 times. If discoloration or contamination occurs earlier, do not use the cleaning disk.

SCANNING DRIVES

Scanning drives is a procedure for checking each storage medium for file system errors and defective sectors, and repairing them.   Scan the drives when a Windows error occurs during the use of an AMNC-F application or when the entire Windows system becomes unstable and does not operate as it should do.

Scanning drives calls for logging off the account under which the AMNC-F application is executed and logging on with an administrator authority account.

Ask the network administrator or AMADA about the user name and password of the administrator authority account.   The default settings are as follows:

User name: Administrator

Password: None or amncpc

Before performing the log-off, log-on, and drive scan, press one of the EMERGENCY STOP buttons, and check that the machine will never operate.   Scanning drives may take more than 30 min, depending on the number of files stored in each drive.   You cannot use the machine during this processing.

The AMNC-F system has the following drives to be scanned:

- Data drive F
- Backup drive D
- Application drive G

The drives can be scanned only one at a time.   Repeat the following drive scan procedure for the number of drives installed.

NOTE

● System drive C cannot be scanned.

1 Press the Ctrl and Esc keys on the keyboard to display the Start menu, and select Shut Down from the Start menu.

2 Select Log off AMNCPC, and press the OK button.

3   When the Log On to Windows display appears, enter the user name and password of the administrator authority account, and press the OK button.

Wait for a while before the Windows system starts up.
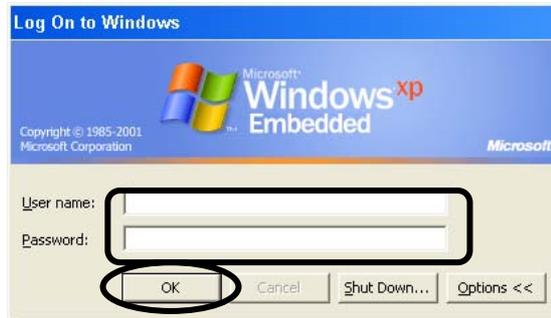
4   Press the Ctrl and Esc keys on the keyboard.

5   From the Start menu, select Programs, Accessories, and Windows Explorer.

6   When the Explorer is launched, select My Computer, and click and select the drive you want to scan.
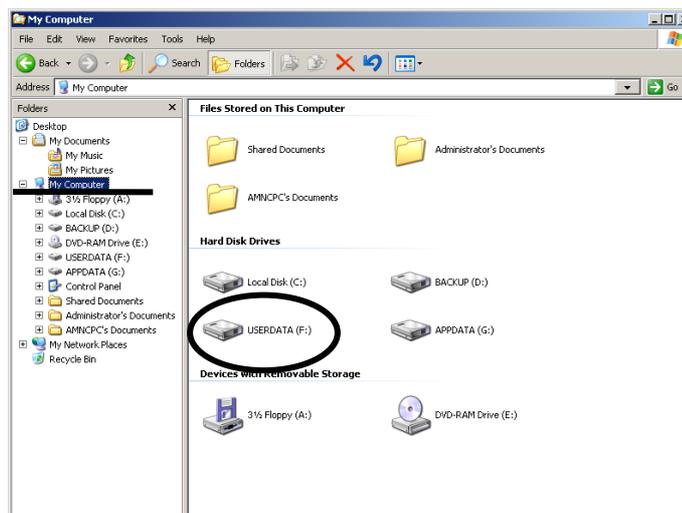
7 Press the Shift and
F10 keys on the
keyboard to display
the menu shown right,
and select Properties.

Local Disk (C:)   B/

USERDATA (F:)   Al

Explore
Open
Search...

Devices with Remova

Sharing and Security...

3½ Floppy (Format...   V

Copy

Create Shortcut
Rename

Properties

8 When the following window is displayed, select Tools, and press
the Check Now button for Error-checking.

USERDATA (F:) Properties   ? ✕

General | Tools | Hardware | Sharing | Security | Quota |

Error-checking
  This option will check the volume for
  errors.

                         Check Now...

Defragmentation
  This option will defragment files on the volume.

                         Defragment Now...

Backup
  This option will back up files on the volume.

                         Backup Now...

        OK   Cancel   Apply

9 Check the Check disk options check boxes, and press the Start
button.

Check Disk USERDATA (F:)   ? ✕

Check disk options
  ☑ Automatically fix file system errors
  ☑ Scan for and attempt recovery of bad sectors

        Start   Cancel

VIII-17
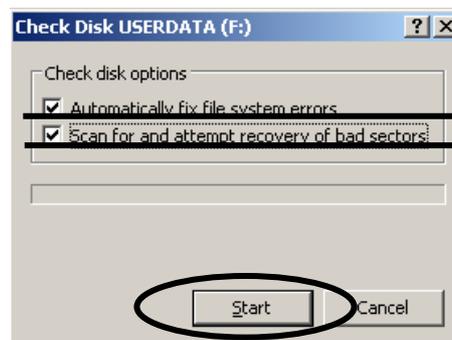
10   The following window is displayed when the scan is completed.
      Press the OK button.

11   Quit the Windows Explorer.

12   Press the Ctrl and Esc keys on the keyboard to display the Start
      menu, and select Shut Down from the Start menu.

13   Select Restart, and press the OK button.

14   Make sure that the Windows XP is launched and the initial display
      of AMNC-F is shown.

CHANGING BATTERY OF PANEL i

> ⚠️ **WARNING** ● **Changing the battery of PANEL i is very dangerous. Be sure to ask AMADA to perform the work.**

When the battery of PANEL i drops in voltage, the following message appears on the screen.

```
Phoenix BIOS 4.0 Release 6.0
Copyright 1985-2002 Phoenix Technologies Ltd.
All Right Reserved

FANUC BIOS, 6150/03
Copyright 2002 FANUC LTD.
All Right Reserved

CPU= Intel(R) Celeron(TM) Processor 733MHz
639K System RAM Passed
125M Extended RAM Passed
0128K Cache SRAM Passed
System BIOS shadowed
Video BIOS shadowed
      CMOS Battery Failure
      **System Stopped by Temperature/Fan/Battery Alarm,Turn Off the Power.**




Press ＜F2＞  to enter  SETUP
```

It is necessary to change the battery of PANEL i. Ask AMADA to perform the work. The battery lasts about 10 years, although its life may change with its operating environment.

BATTERY

CHANGING SHEAR PLATE

⚠️ **CAUTION**   ● **This work is dangerous. Ask the AMADA service engineer to perform it.**

This machine has a shear plate installed between the striker and backup plate for its own protection. When the machine is overloaded during its punching operation, the shear plate breaks to protect the machine from damage.

When the shear plate is broken, it must be changed. Contact the AMADA service engineer.

1   Remove from the turret the punch installed near the bottom of the striker so that it does not interfere with the removal of the broken shear plate.

2   Turn off the power of the NC unit, and turn the machine circuit breaker switch to OFF.

3   Turn off the compressed air.

4   Remove the air tubes from the four one-touch fittings of the punch positioning air cylinders.
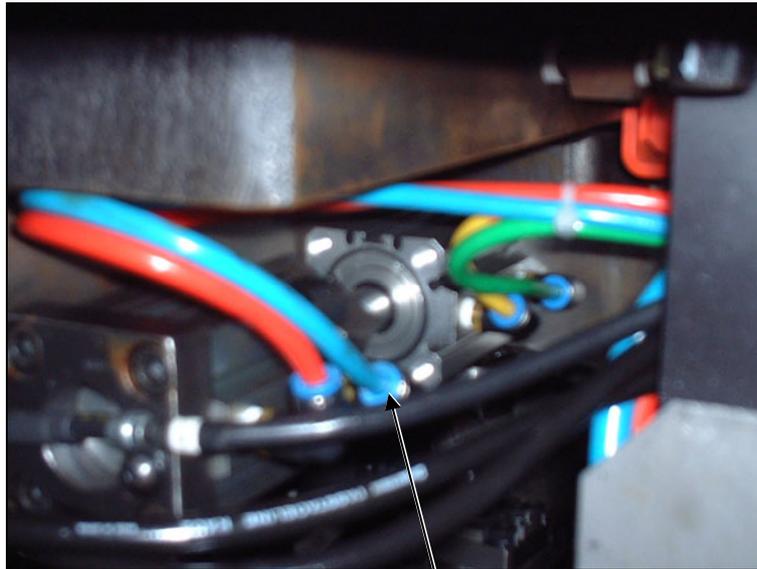
AIR TUBE

5   Remove the lubrication hoses and the like.

LUBRICATION HOSE
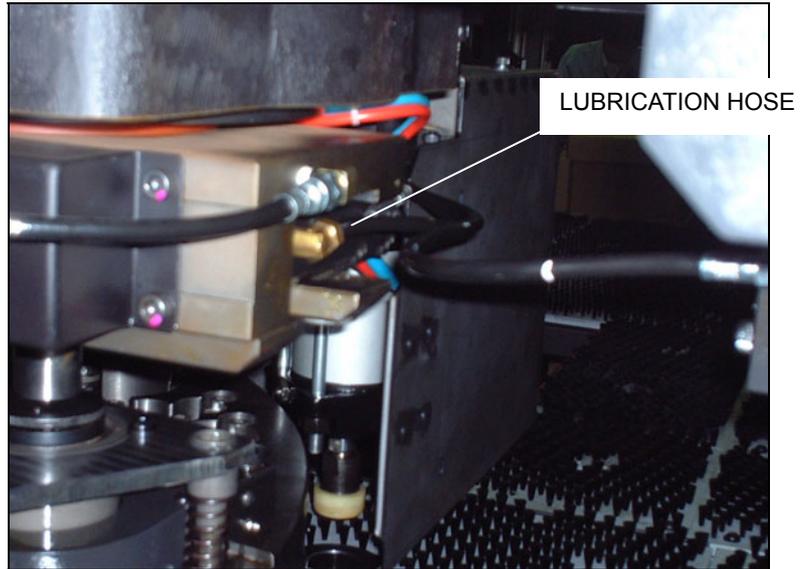
6   Remove the bolts securing the punch holder bracket, and pull out the striker and punch holder together.

7   Remove the backup plate.

8   Change the broken shear plate.

9   Perform steps 1 to 8 above in reverse order to reassemble the removed parts.

> NOTE

● Wipe each part clean before reassembly.

● After reassembly, lubricate the striker with oil.

10   Turn on the compressed air.

11   Turn the machine circuit breaker switch to ON, and turn on the power of the NC unit.

12   Select a tool in the MDI mode, and check that the striker moves smoothly.

LUBRICATION

Lubricate machine parts, add lubricants, or change lubricants as described below during the daily and periodical maintenance operations.

RECOMMENDED LUBRICANTS

A: Exxon Teresstic 33, Mobil DTE Oil Light, or Shell Tellus Oil 32

B: Exxon Lidok EP 2, Mobil Mobilux 2, or Shell Alvania EP Grease 2

C: Exxon Lidok EP-0, Mobil Mobilux EP-0, or Shell Alvania EP Grease R0

D: AMADA GREASE SRL

NOTE

● For handling the lubricants and their chemical composition and other details, refer to Appendix.

No.	Lubrication point	Type	Source		Frequency
1	Turret index pin (upper)	B	Grease nipple		Monthly
2	Turret index pin (lower)	B	Grease nipple		Monthly
3	Striker	B	Grease nipple		Monthly
4	X-axis ball nut	C	Grease nipple		Monthly
5	Y-axis ball nut	C	Grease nipple		Monthly
6	X-axis guide nut	C	Grease nipple		Monthly
7	Y-axis guide nut	C	Grease nipple		Monthly
8	LM guides under table	C	Grease nipple		Monthly
9	Automatic grease pump	C	Reservoir		Add
10	Workclamps	A	Oil gun		Daily
11	Punches and turret lifter collars	A	Oil gun		Daily
12	Lubricator	A	Oil mist		Adjust/add
13	Upper and lower turret drive chains	A	Oil gun		Quarterly
14	Y-axis gear box	A	Oil bath		Quarterly
15	Lubricator	A	Oil mist		Replenish
16	Tap turret	D	Grease nipple		Monthly
17	Oil for tapping		Cutting	AML-2(Amada)	
			Forming	Tanoi Shincool 99X Super (Shincool)	
18	Oil for repositioning clamp		NCA-250(Amada)		

EMZ3610NT
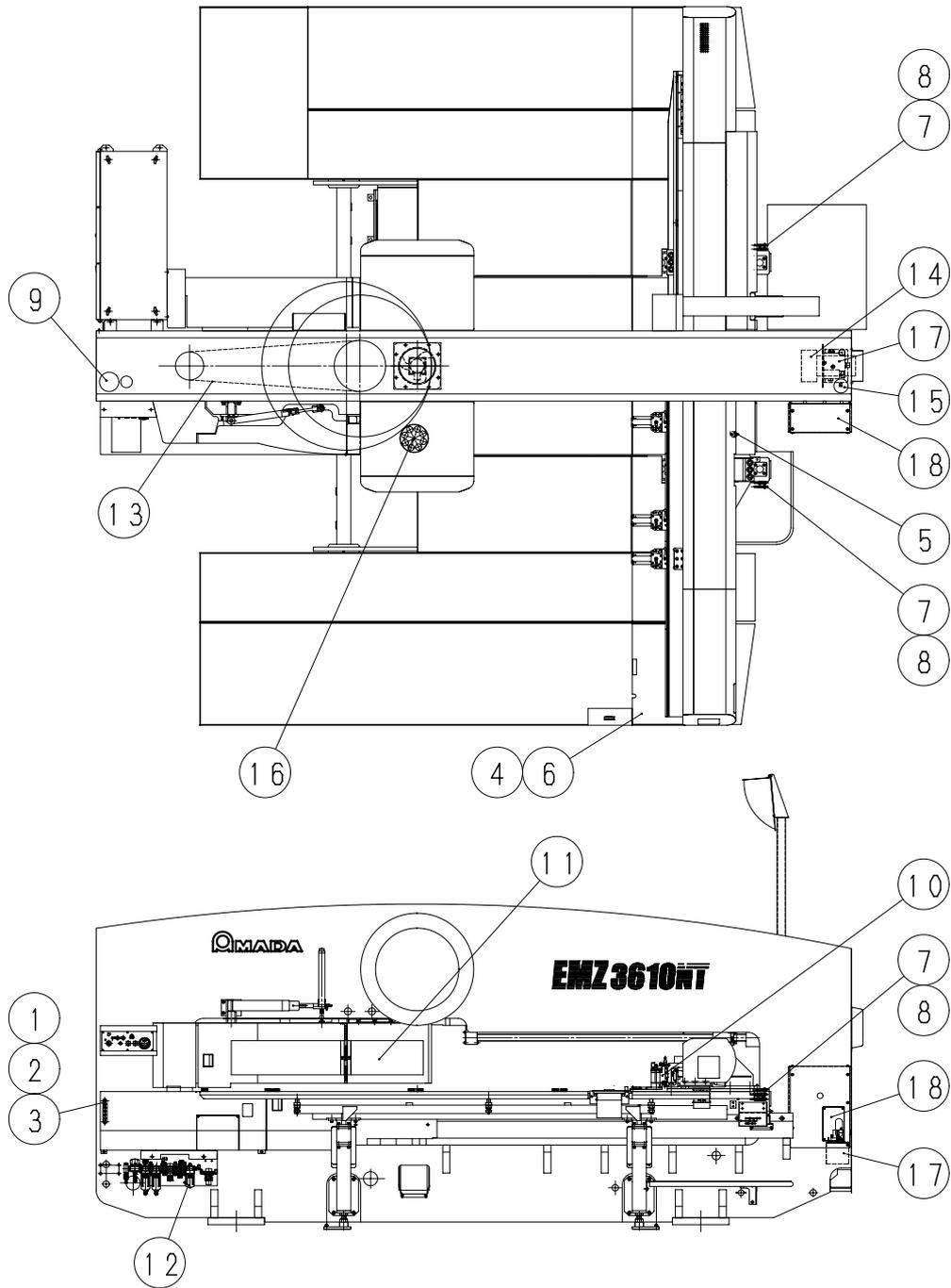
Some machine parts are equipped with grease nipples.

Auto-index devices

Apply one of the recommended lubricants through the grease nipples on the sides of the upper and lower turret disks.   The grease nipple on the lower turret disk can be found by removing the die holder.

RECOMMENDED LUBRICANTS

D: Exxon Beacon 325 or Shell Alvania Grease RA

NOTE

● For handling the lubricants and their chemical composition and other details, refer to Appendix.

No.	Lubrication point		Type	Source	Frequency
1	Auto index 1-1/4"	Worn axis (upper)	D	Grease nipple	Monthly
2		Die rotation	D	Grease nipple	Monthly
3		Worn axis (lower)	D	Grease nipple	Monthly
4	Auto index 2"	Worn axis (upper)	D	Grease nipple	Monthly
5		Holder rotation	D	Grease nipple	Monthly
6		Die rotation	D	Grease nipple	Monthly
7		Worn axis (lower)	D	Grease nipple	Monthly
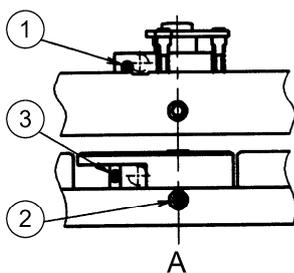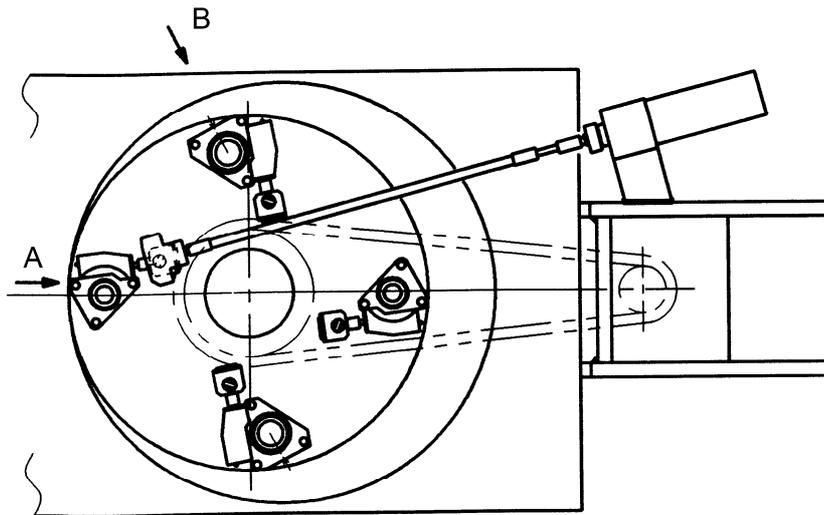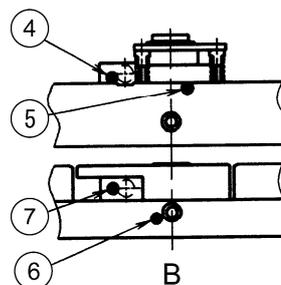
AUTO INDEX 1-1/4"   AUTO INDEX 2"

AUTOMATIC GREASE LUBRICATOR

The ram and crankshaft are grease lubricated by an automatic grease lubricator. The lubrication rate is controlled by the NC unit.

The automatic grease lubricator is located in the cover at the T-axis motor side of the machine (or at the electrical control cabinet side). Loosen the knurled head screws, and open the cover. (See the photo right.)

A grease cartridge recommended for use with the automatic grease lubricator contains 400 cm^3 {13.5 fl.oz.} of grease and can accommodate about 167 grease lubrication times.

The EM series operates the automatic grease lubricator once per every 4000 hits. This means that one grease cartridge can be used for about 668000 hits.

When the residual amount of grease reaches the level set on the INSPECTION display, the warning message "2224 GREASE EXCHANGE TIME OF AUTOMATIC GREASE LUBRICATOR" appears. When the automatic grease lubricator runs out of grease, the alarm message "2075 LUBRICATION" appears, and the machine stops.

Pay attention to the residual amount of grease when you operate the machine for a long period of time. Change the grease cartridge and set the residual amount of grease on the INSPECTION display according to your machine operating conditions.

<Example>

The residual amount of grease is set at 30% on the INSPECTION display.

Since one grease cartridge can accommodate about 167 grease lubrication times, the residual amount of 30% can be used for 167 times × 30% = 50 times. In other words, when the warning message 2224 is displayed, enough grease is still left for 50 grease lubrication times.

Since the automatic grease lubricator is automatically operated to provide lubrication once per 4000 hits, the residual amount of 30% can last 4000 hits/time × 50 times = 200000 hits.

NOTICE

● When the COMPLETE button on the INSPECTION display is pressed after a grease cartridge change, the following window pops up. Press the YES button to reset the residual amount to 100%.

Message center

Does it complete [Auto Grease Lubricator residual quantity[%]] ?

YES   NO
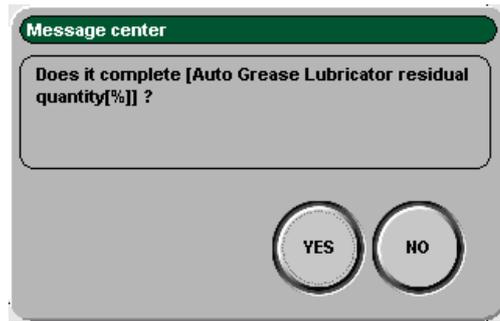
NOTE

● The number of lubrication times possible with the automatic grease lubricator and the residual amount of grease in the automatic grease lubricator given above are not measured values.   Some errors may occur when these values are used to calculate the numbers of lubrication times and hits as described above.

Refilling automatic grease lubricator

The automatic grease lubricator is refilled by changing the grease cartridge.   Screw in the new grease cartridge, and replace the cartridge cover.

Check the grease level of the cartridge in the automatic grease lubricator every day.   As soon as the grease level goes below the LOW level marked on the cartridge cover, remove the cartridge and install the new one.

When the grease cartridge runs out of the grease, proper lubrication cannot be provided, and a lubrication alarm is displayed on the screen.

Remove cartridge cover

Remove empty cartridge, and install new cartridge

Replace cartridge cover
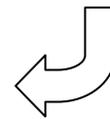
Changing grease cartridge

Carefully change the grease cartridge as described below.

1 Turn the cartridge cover "1" by about 60° counterclockwise to remove it from the pump.
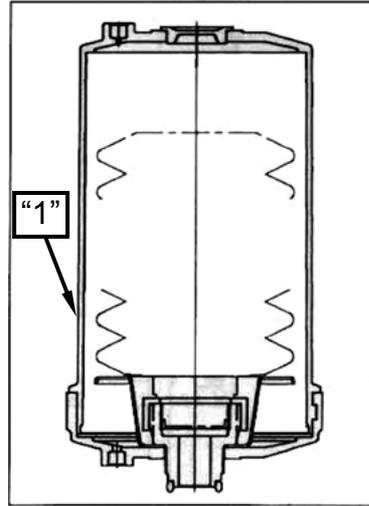
2 Turn the used grease cartridge "2" counterclockwise to remove it.

Do not remove the seal cap "5".
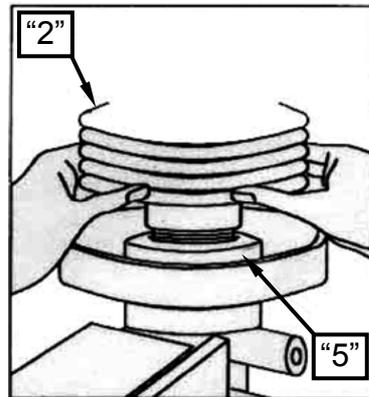
3 Remove the cap "3" and plug "4" of the new grease cartridge.
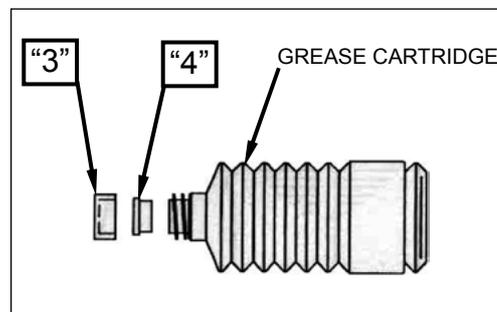
4 Squeeze the grease cartridge to force out the grease into a mountain shape.

5   While putting the squeezed grease into the mounting hole, turn the grease cartridge clockwise to securely screw it in (it does not go any further after about five turns).

6   Replace the cartridge cover "1", and turn it clockwise to secure it. Unless it is securely closed, it may come loose due to the vibration of the machine.

7   Bleed air from the automatic grease lubricator.   Refer to "Bleeding air from automatic grease lubricator" on the next page.

Specified grease cartridge

Model	Manufacturer	Remarks
Lidok EP-0	Exxon	Specify a 400 cm^3 {13.5 fl.oz.}
Mobilux EP-0	Mobil	Specify a 400 cm^3 {13.5 fl.oz.}
Alvania EP Grease R0	Shell	Specify a 400 cm^3 {13.5 fl.oz.}

Any other grease cartridge cannot be used.   This grease cartridge is disposal or nonreusable.

Bleeding air from automatic grease lubricator

Bleed air from the automatic grease lubricator as described below. Since air and grease may sometimes spurt out, wear protective goggles when bleeding air from the automatic grease lubricator.

1 Turn on the machine and NC unit.

2 Remove the 1/2" hexagon socket head air bleed plug at the side of the pump with an Allen wrench (5 mm).

3 Press the LUBRICATION button on the main control panel.

The pump runs, and air bubble-containing grease comes out of the air bleed hole.

Take care that air and grease may sometimes spurt out of the air bleed hole.

ALLEN WRENCH (5 mm)

AIR BLEED PLUG

4 Press the LUBRICATION button several times until no more air bubble-containing grease comes out of the air bleed hole.   When clean grease without air bubbles continuously comes out, the air bleeding procedure is completed.

5 Replace the air bleed plug.

6 Press the LUBRICATION button again to check that no grease comes out of the air bleed hole.
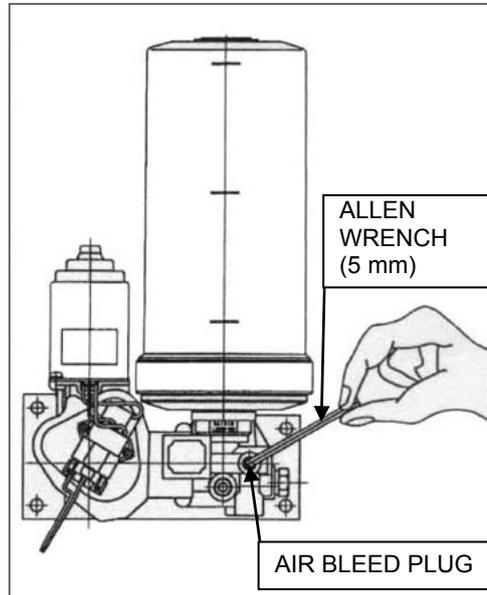
Cleaning reservoir tray of used grease

After lubricating the ram and crankshaft, the used grease collects in the reservoir tray.   When changing the grease cartridge, be sure to clean the reservoir tray of the collected used grease.

NOTICE

● Unless removed from the reservoir tray, the used grease overfills the reservoir tray and drips onto the brush table.

NOTE

● When the machine is initially started, the grease takes some time to reach the reservoir tray due to the piping route.

Clean the reservoir tray of the used grease as described below.

1 The reservoir tray is located near the striker at the front of the machine.
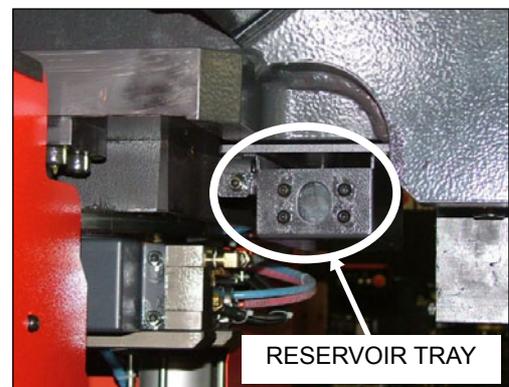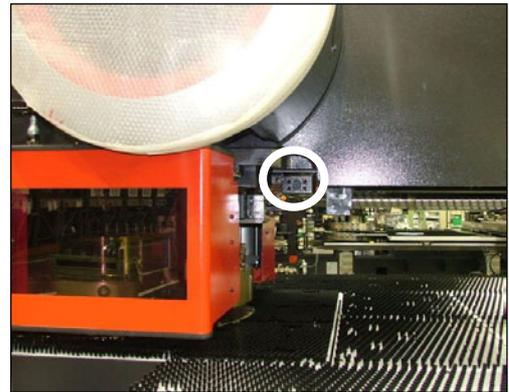
RESERVOIR TRAY

2 Place a waste cloth or the like on the brush table to protect it. The used grease may drip onto the brush table.
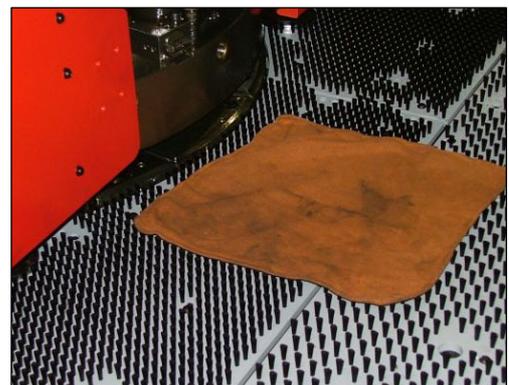
3 Loosen and remove the M6 bolt securing the reservoir tray with an Allen wrench (5 mm).

M6 RESERVOIR TRAY SECURE BOLT
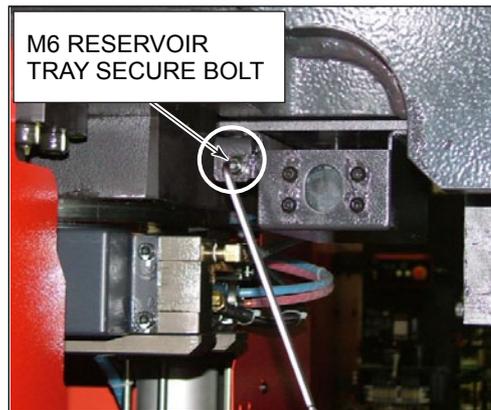
4 Pull out the reservoir tray forward.
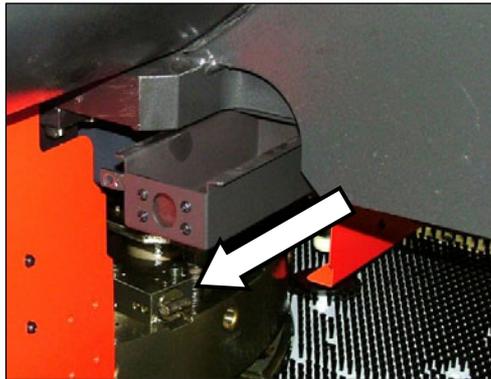
5 Empty the removed reservoir tray of the collected used grease.

6 Replace the removed reservoir tray in a reverse procedure. Insert it deep, and securely tighten the M6 bolt to secure it with the Allen wrench (5 mm).

M6 RESERVOIR TRAY SECURE BOLT
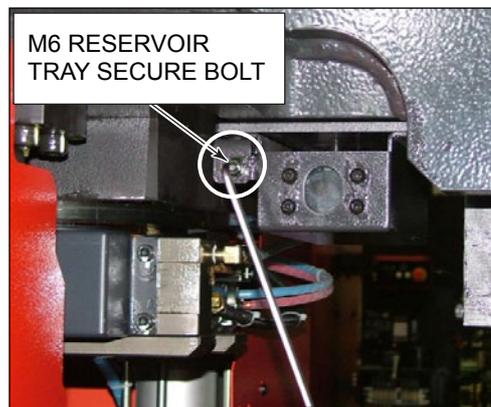
MAJOR OPERATION FAULTS

The causes of major operation faults and their remedies are as follows:

- The NC unit cannot be turned on.
  - — The machine circuit breaker switch is not turned to ON.   Turn it to ON.
  - — A fuse in the electrical control cabinet is blown.   Change it.

- The alarm message "2061 AIR PRESSURE" is shown on the screen.
  - — The operating air pressure has been reduced.   Adjust the pressure to 0.5 MPa (5.0 kgf/cm^2 or 72 psi), and press the RESET key.
  - — The pressure switch SP1 is faulty.   Adjust or change it.

- Punching cannot be performed.
  - — The machine is in a stop condition.   Reset it.
  - — The turret index pins are not inserted into the turret.   Insert them into the turret.
  - — The NC mode is not properly selected.   Change the NC mode.
  - — The PRESS SELECT keyswitch is turned to OFF.   Turn it to CYCLE or INCHING.

- The TOP DEAD CENTER light does not illuminate.
  - — The press is not at the top dead center.   Press the RESET key.

- The X-axis and Y-axis do not operate.
  - — The X-gauge block is not lowered.   Lower it.
  - — A tool change door is open.   Close it.
  - — The workclamps are open.   Close them.

CIRCUIT PROTECTORS AND FUSES

Both circuit protectors and ordinary fuses are used.

A circuit protector turns off when an overcurrent flows to the circuit and can be reset to the ON position after removing the cause of the overcurrent.   Devices, such as the amplifiers for the X-axis, Y-axis, T-axis, C-axis, optional U-axis and optional V-axis, and the A-axis amplifier switching regulator, are protected by circuit protectors.

A blown fuse can be identified through the hole in the back of the fuse block.   Remove the cause of the overcurrent, and change the blown fuse for a spare.

Fuses inside electrical control cabinet

Module	Indication of blown fuse	Maker	Parts number of fuse	Qty	Rated current
Main CPU	PWR off	FANUC	A02B-0236-K100	2	5.0 A
IO module	F on	FANUC	A03B-0815-K001	4	1.0 A
Power supply module	F on	FANUC	A06B-6077-K250	4	2.0 A
Servo amplifier SVM	F on	FANUC	A06B-6073-K250	4	3.2 A

Part IX

Tooling

TURRET STATION ARRANGEMENT

70-STATION TURRET (King type-TURRET)

Tool Type	Nominal Tool Size	Standard Punch Size	No. of Stations*
A	1/2"	1.6 – 12.7 mm dia. (0.063" – 0.5" dia.)	36 (24)
B	1-1/4"	12.8 – 31.7 mm dia. (0.501" – 1.25" dia.)	24 (24)
C	2"	31.8 – 50.8 mm dia. (1.251" – 2" dia.)	4 (4)
D	3-1/2"	50.9 – 88.9 mm dia. (2.001" – 3.5" dia.)	2 (2)
E	4-1/2"	89.0-114.3 mm dia (3.501" – 4.5" dia)	2 (2)
G	1-1/4"	12.8 – 31.7 mm dia. (0.501" – 1.25" dia.)	2 (2)

* The numerals in parentheses indicate the number of stations which can accept shaped tools.

G : AUTO-INDEX Station

58-STATION TURRET (King type-TURRET)

Tool Type	Nominal Tool Size	Standard Punch Size	No. of Stations*
A	1/2"	1.6 – 12.7 mm dia. (0.063" – 0.5" dia.)	24 (16)
B	1-1/4"	12.8 – 31.7 mm dia. (0.501" – 1.25" dia.)	24 (24)
C	2"	31.8 – 50.8 mm dia. (1.251" – 2" dia.)	4 (4)
D	3-1/2"	50.9 – 88.9 mm dia. (2.001" – 3.5" dia.)	2 (2)
G	1-1/4"	12.8 – 31.7 mm dia. (0.501" – 1.25" dia.)	2 (2)
J	4-1/2"	89.0-114.3 mm dia (3.501" – 4.5" dia)	2 (2)

* The numerals in parentheses indicate the number of stations which can accept shaped tools.

G,J : AUTO-INDEX Station

58-STATION TURRET (Z type-TURRET)
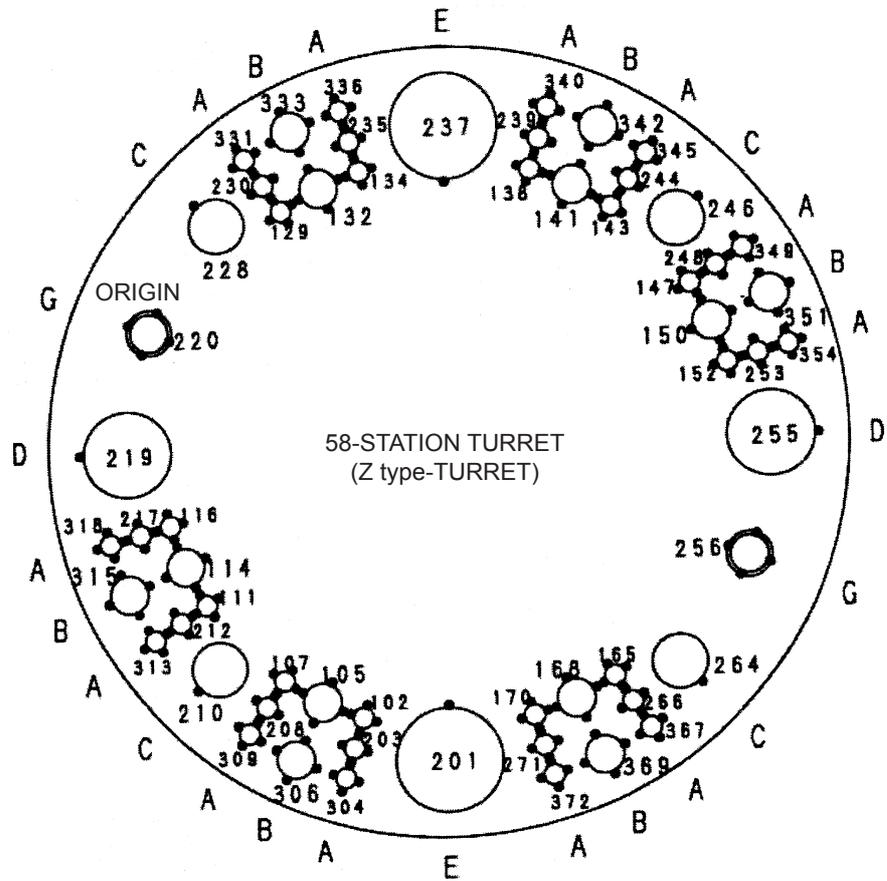
Tool Type	Nominal Tool Size	Standard Punch Size	No. of Stations*
A	1/2"	1.6 – 12.7 mm dia. (0.063" – 0.5" dia.)	36 (36)
B	1-1/4"	12.8 – 31.7 mm dia. (0.501" – 1.25" dia.)	12 (12)
C	2"	31.8 – 50.8 mm dia. (1.251" – 2" dia.)	4 (4)
D	3-1/2"	50.9 – 88.9 mm dia. (2.001" – 3.5" dia.)	2 (2)
E	4-1/2"	89.0-114.3 mm dia (3.501" – 4.5" dia)	2 (2)
G	1-1/4"	12.8 – 31.7 mm dia (0.501" – 1.25" dia)	2 (2)

* The numerals in parentheses indicate the number of stations which
can accept shaped tools.
G: AUTO-INDEX Station

45-STATION TURRET (Z type-TURRET)
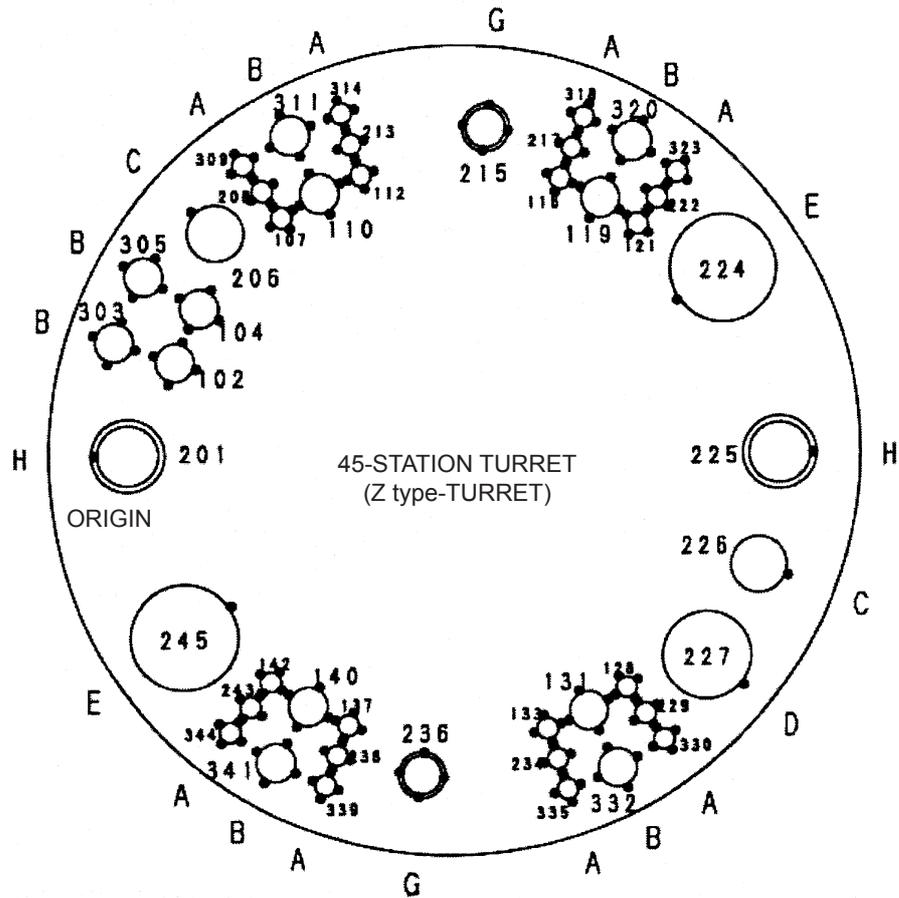
Tool Type	Nominal Tool Size	Standard Punch Size	No. of Stations*
A	1/2"	1.6 – 12.7 mm dia. (0.063" – 0.5" dia.)	24 (24)
B	1-1/4"	12.8 – 31.7 mm dia. (0.501" – 1.25" dia.)	12 (12)
C	2"	31.8 – 50.8 mm dia. (1.251" – 2" dia.)	2 (2)
D	3-1/2"	50.9 – 88.9 mm dia. (2.001" – 3.5" dia.)	1 (1)
E	4-1/2"	89.0-114.3 mm dia (3.501" – 4.5" dia)	2 (2)
G	1-1/4"	12.8 – 31.7 mm dia (0.501" – 1.25" dia)	2 (2)
H	2"	31.8 – 50.8 mm dia (1.251" – 2"dia)	2 (2)

*   The numerals in parentheses indicate the number of stations which can accept shaped tools.
G, H: AUTO-INDEX Station

KEYS AND KEYWAYS IN TOOLS AND TURRET STATIONS

KEYS AND KEYWAYS IN TOOLS (STANDARD TOOLS)

1/2" and 1-1/4" shaped punches:
Two keyways
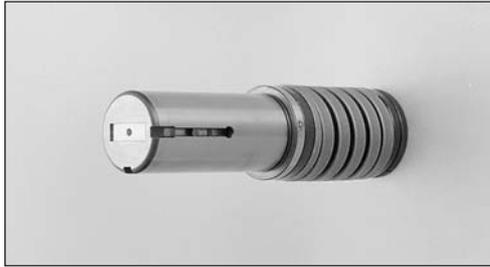
1/2" and 1-1/4" round punches:
One keyway
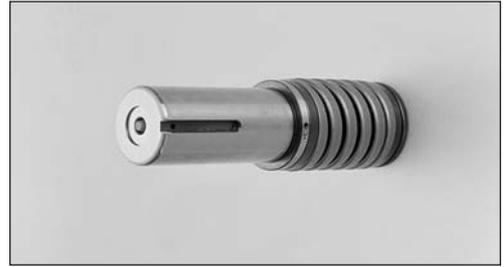
2", 3-1/2" and 4-1/2" shaped and round punches:
Two keyways
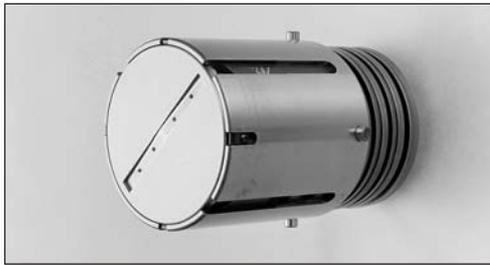
1/2" and 1-1/4" shaped dies:
One key

1/2" and 1-1/4" round dies:
One key

2", 3-1/2" and 4-1/2" shaped dies:
Two keyways

2", 3-1/2" and 4-1/2" round dies:
One keyway

KEYS AND KEYWAYS IN TOOLS (NEX PUNCHES)

1/2" shaped punches:
Two keyways

1-1/4" shaped punches:
Two keyways

● Round punches have only one keyway.

KEYS AND KEYWAYS IN TOOLS (Z STYLE GUIDES)

2" shaped punches:
Two keyways

3-1/2" and 4-1/2" shaped punches:
Two keyways

● Round punches have only one keyway.

KEYS AND KEYWAYS IN TURRET STATIONS (King type-TURRET)

1/2" stations (upper turret disk):One key (270°) in outer track and inner track, and no keys in center track
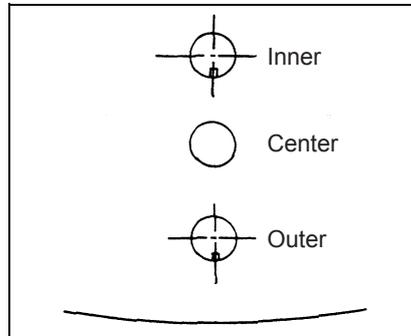
1/2" stations (lower turret disk): Four keyways (0, 90, 180, 270°) in outer track, no keyways in center track, and two keyways (180, 270°) in inner track

Inner

Center

Outer

Inner

Center

Outer
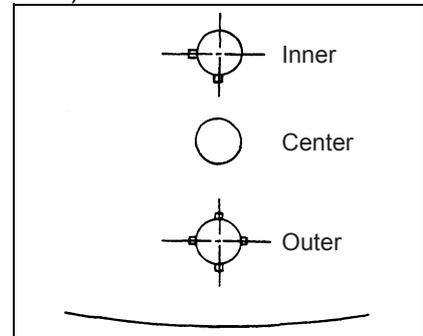
1-1/4" stations (upper turret disk): One key (270°)

1-1/4" stations (lower turret disk): Four keyways (0, 90, 180, 270°)*

[Auto-index station]

[Standard station]

Center

Outer

[Auto-index station]

[Standard station]

Inner

Outer
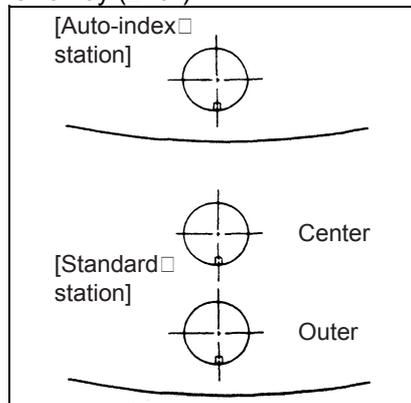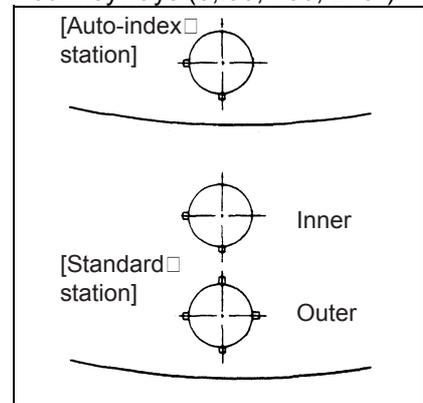
*Two keyways (180, 270°) at auto-index stations

2" and 3-1/2" stations (upper and lower turret disks): One key (270°)
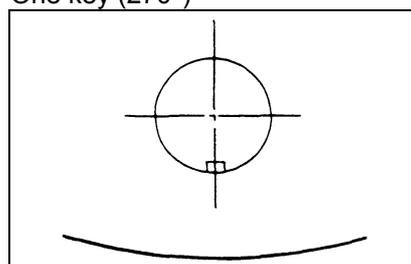
4-1/2" station (upper and lower turret disks): One key (90°)
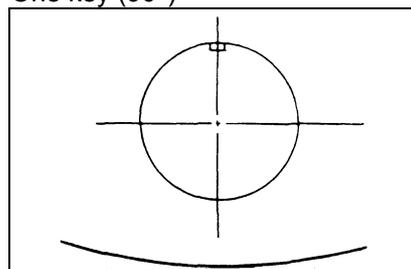
KEYS AND KEYWAYS IN TURRET STATIONS (Z type-TURRET)

1/2" stations (upper turret disk):
One key (270°) in outer track, center track and inner track

Inner

Center

Outer

1/2" stations (lower turret disk):
Four keyways (0, 90, 180, 270°) in outer track, center track and inner track

Inner

Center

Outer

1-1/4" stations (upper turret disk):
One key (270°)

[Auto-index station]

Inner

[Standard station]   Outer

1-1/4" stations (lower turret disk):
Four keyways (0, 90, 180, 270°)*

[Auto-index station]

Inner

[Standard station]   Outer

* Four keyways (180, 270°) at auto-index stations

2" and 3-1/2" stations (upper and lower turret disks):
One key (270°)

4-1/2" stations (upper and lower turret disks):
One key (90°)
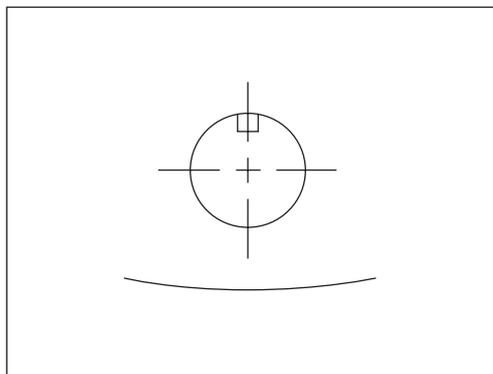
MAINTAINING TOOLS

Checking tools

<table>
<tr>
<td>⚠ WARNING</td>
<td>● If you fail to maintain the tools, not only the tools and machine may break, but also the worksheet may come off the workclamps and fly off the machine.</td>
</tr>
</table>

Be sure to observe the following precautions.

- For small-diameter tools (Types A and B), periodically check the punch guide fixing O-rings (retainers) for wear, and change them if necessary.

  Recommended O-rings:

  P18B for Type A
  P26B for Type B

- Check the punch guide outside surface for dust buildup, damage, and deformation. If the punch guide is covered with dust, clean it. If the punch guide is damaged or deformed, repair or change it.

- Pass each punch guide through a master gauge to check that the keyway is not damaged or deformed. If the keyway is damaged or deformed, repair or change the punch guide.

- Check the punches and dies for edge wear. If the edge is worn dull, grind it.

- Disassemble each punch, and check that scale is not collected inside. If scale is collected, remove it.

- Check each stripping spring for fatigue. If it is fatigued, change it.

DISASSEMBLING AND ASSEMBLING PUNCHES (TYPES A AND B)

Type A (1/2")

1. Punch head
2. Punch head collar
3. Punch body
4. Stripping spring
5. Retainer collar
6. Retainer ring
7. Punch guide

Type B (1-1/4")

1. Punch head
2. Punch head collar
3. Punch body
4. Stripping spring
5. Retainer collar
6. O-ring (or set screw)
7. Punch guide
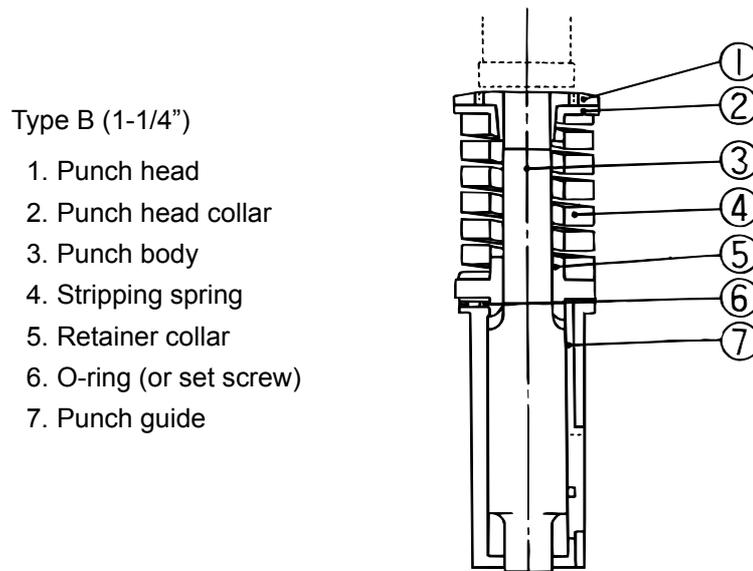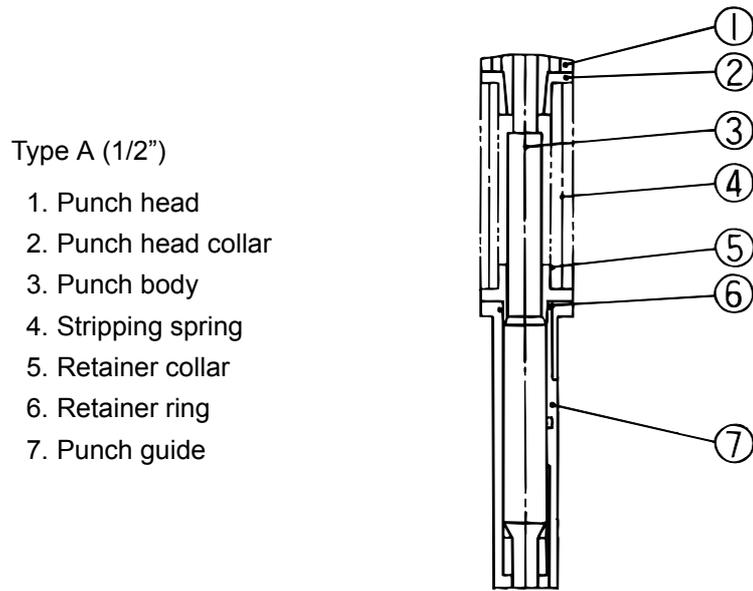
Disassembly:

1 Remove the punch guide from the punch assembly as shown below.   When the punch guide is fastened with the set screw, loosen the set screw, and remove the guide.

PUNCH GUIDE

SET SCREW

When the punch guide is not fastened with the set screw, use the QS pliers to disassemble the punch guide.   How to use the QS pliers is described below.

> ─── NOTE ───
>
> ● The QS pliers is supplied with the machine.   It has two parts.   One part is used for Type A (1/2"), and the other is used for Type B (1-1/4").

USED FOR B TYPE

USED FOR A TYPE

(1) Place the QS pliers to the clearance between the retainer collar and the punch guide.   The ground surface must be placed on the spring side for easy operation.

Type A

Type B

(2) Grip the handle of the QS pliers to the end position.

(3) Remove the punch body from the punch guide.
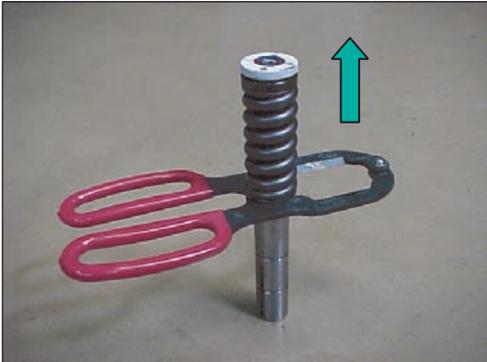
Type A   Type B
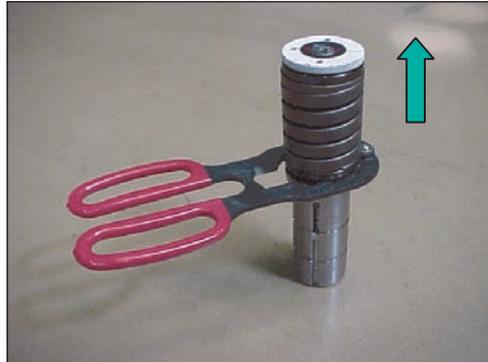
NOTE

● When using the QS pliers, take care not to get the fingers pinched and injured with the QS pliers.

2   Clamp the punch body in a soft-jaw vise.

3   Install the M5 bolts (for the Type A punch) or the M6 bolts (for the Type B punch) in the two bolt holes in the punch head.

4   Tighten the bolts equally until the clearance between the punch head and its collar is approximately 5 mm (0.2 in.).

5   Loosen the punch head with a belt wrench, and disassemble the punch assembly.
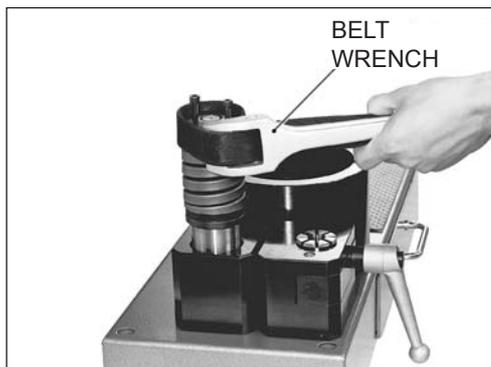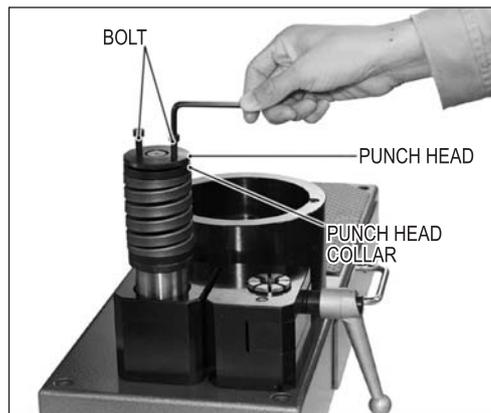
Assembly:

Assemble the retainer collar, stripping spring, punch head collar, and punch head to the punch body.   Using the belt wrench, tighten the punch head until the specified punch height is obtained.   Apply a coat of machine oil to the frictional surface of the punch body, and assemble the punch guide to the punch body.

REMOVING AND INSTALLING PUNCH TIPS (TYPES C, D, AND E)

1. Punch head
2. Punch driver
3. Stripping spring
4. Punch tip clamp bolt
5. Key
6. Stripper plate
7. Punch guide
8. Punch tip
9. Stripper plate spring
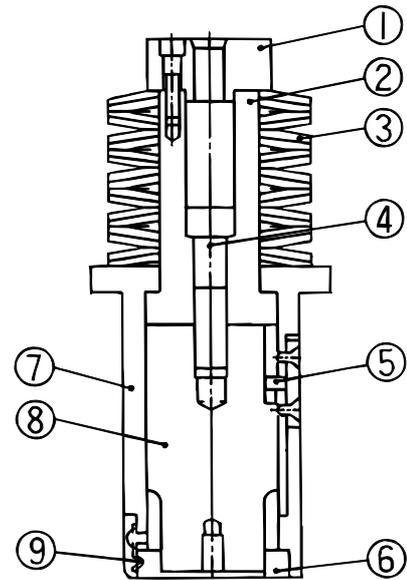
Removal:

1   Clamp the punch assembly in a soft-jaw vise, and loosen the punch tip clamp bolt with a T-wrench.

2   Loosen the screws retaining the stripper plate springs, and remove the stripper plate.

3   Screw the die remover into the threaded hole of the punch tip, and pull out the punch tip.

PUNCH TIP
STRIPPER PLATE
SCREW

Installation:

1   Apply a coat of machine oil to the punch tip, and insert the punch tip into the punch guide.

2   Install the stripper plate, and tighten the screws retaining the stripper plate springs.

3   Clamp the punch assembly in the soft-jaw vise, and tighten the punch tip clamp bolt securely.

REGRINDING TOOLS

The tools or punches and dies should be reground frequently to extend their service life.   Observe the edges of the punch and die to be sure that they are sharp and lustrous.   If the edges are rounded or have a frosted appearance, the punch and die should be reground.   If grinding is not done frequently at the correct stage of wear, the extra force required by the already frosted edge causes increasingly rapid and intense wear.   Proper grinding for one time would be 0.2 mm (0.008 in.) for the punch and 0.1 mm (0.004 in.) for the die.   The punch can be ground a maximum of 2 mm (0.08 in.) during its service life, and the die can be ground a maximum of 1 mm (0.04 in.).   After the punch and die have been ground, their edges should be finished with an oil stone.

ADJUSTING PUNCH AND DIE HEIGHT

After grinding, the punch and die must be adjusted to their specified height.   When adjusting the punch and die height, observe the following instructions:

Type A and B punches

Turn the punch head with a belt wrench until the specified punch height is obtained.

Specified punch height: 207.5 mm (8.17 in.)

Type C, D and E punches

Insert a shim (proportionate to the amount of grinding done) between the punch driver and the punch tip to adjust the punch height to the specification.

Specified punch height:

    Type C: 208 mm (8.19 in.)

    Type D: 209 mm (8.23 in.)

    Type E: 210 mm (8.27 in.)
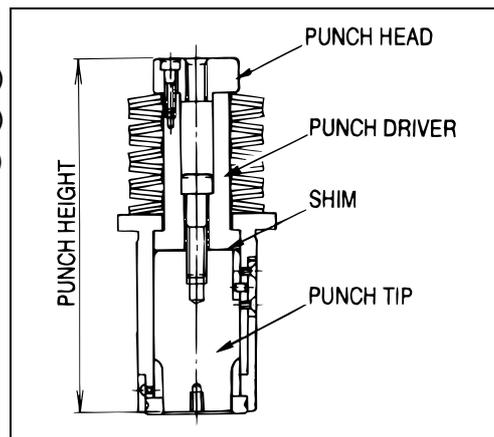
Dies

Insert a shim (proportionate to the amount of grinding done) between the die holder and the die.

Specified die height:

Types A, B, C, D, and E: 30 mm (1.18 in.)
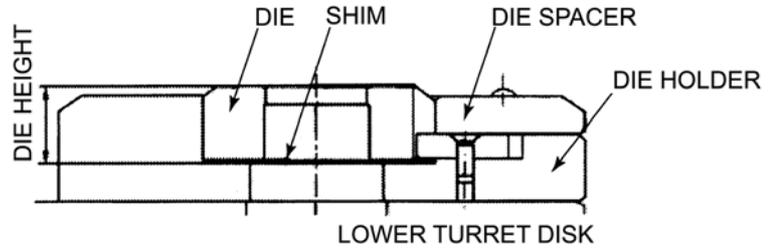
NOTE

● The above figure (die holder) applies to the King-type turret.
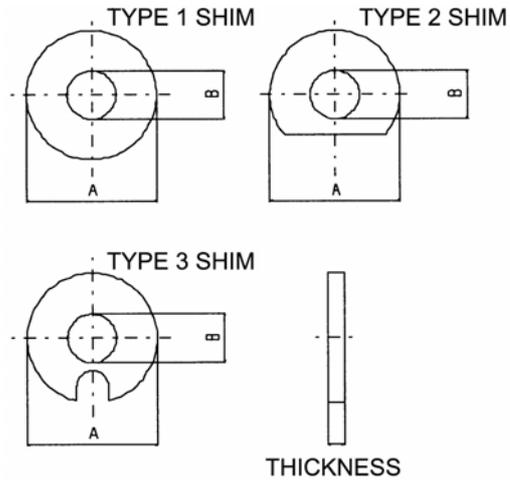
Shim	Type	Size A	Size B	Thickness
For Type C punches	1	40 mm	15 mm	0.4, 0.8, 1.2, 1.6, and 2.0 mm
For Type D punches	3	89 mm	15 mm	Same as above
For Type E punches	3	114 mm	15 mm	Same as above
For Type A dies	1	25 mm	15 mm	0.4, 0.8, and 1.2 mm
For Type B dies	1	47 mm	35 mm	Same as above
For Type C dies	2	88 mm	55 mm	Same as above
For Type D dies	2	125 mm	93 mm	Same as above
For Type E dies	2	158 mm	119 mm	Same as above

ADJUSTING HEIGHT OF NEX PUNCHES

Here are described the approximate methods of adjusting the height of NEX punches.   When using the NEX punches, refer to their operator's manual.

Type A (1/2")

1   Remove the punch guide from the punch assembly with the QS pliers or the like.

2   Equally loosen the two bolts in the punch head to release the lock. While holding the punch body, turn the punch head to adjust the punch height to 207.5 mm (8.17 in.).

3   Equally tighten the two bolts in the punch head, and check that the punch body is fixed.

4   Install the punch guide into the punch body.

Type B (1-1/4")

1   Remove the punch guide from the punch assembly with the QS pliers or the like.

2   Equally tighten the two bolts in the punch head in the clockwise direction to release the lock.   While holding the punch body, turn the punch head to adjust the punch height to 207.5 mm (8.17 in.).

3   Equally loosen the two bolts in the punch head in the counterclockwise direction, and check that the punch body is fixed.

4   Install the punch guide into the punch body.

ADJUSTING HEIGHT OF Z STYLE GUIDES

Here are described the approximate methods of adjusting the height of Z style guides.   When using the Z style guides, refer to their operator's manual.

Type C (2")

1   While pressing and holding the adjust button, turn the punch head to adjust the punch height to 208.0 mm (8.19 in.).

2   Release the adjust button, turn the punch head left and right, and check that the punch head clicks and that the adjust button returns to the original position.

TURN PUNCH HEAD

ADJUST BUTTON
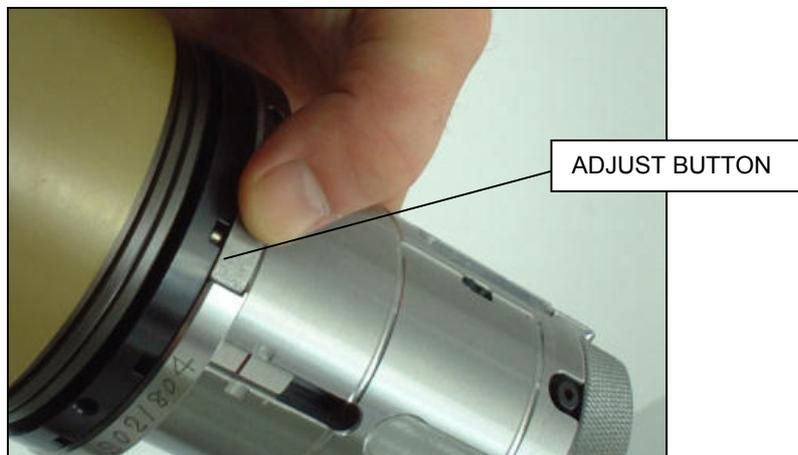
Types D (3-1/2") and E (4-1/2")

1   While pulling the lock release lever, turn the punch head to adjust the punch height to 209.0 mm (8.23 in.) for Type D and to 210.0 mm (8.27 in.) for Type E.

2   Release the lock release lever, turn the punch head left and right, and check that the punch head clicks and that the lock release lever returns to the original position.

TURN PUNCH HEAD

LOCK RELEASE LEVER
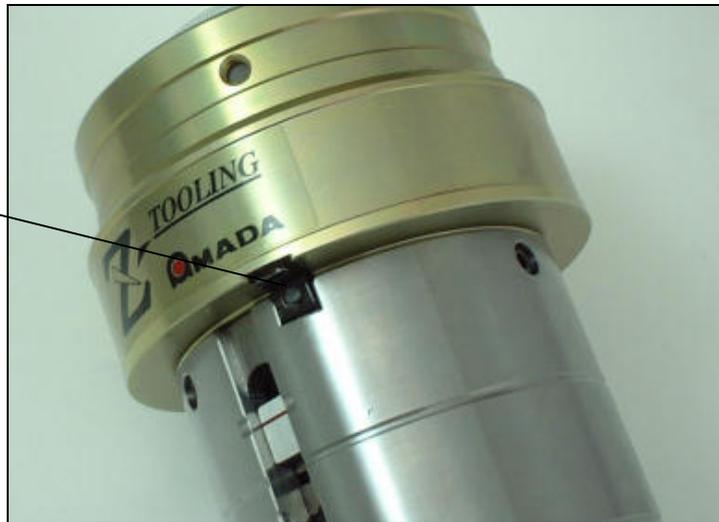
LUBRICATION

Before installing the punch in the turret, apply machine oil to its lubrication points.

Lubrication points:
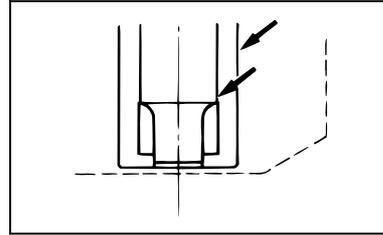
INSPECTING WORKSHEETS

Check that the worksheet is not warped. A warped worksheet will cause the punch to stick to it.

PUNCH-TO-DIE CLEARANCE

The punch-to-die clearance is indicated by the difference between the punch and die diameters.   For example, when a 10-mm diameter punch and a 10.3-mm diameter die are used, the clearance is 0.3 mm.
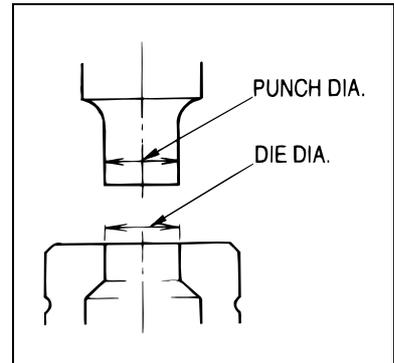
10.3 – 10 = 0.3 (Punch-to-die clearance)

The punch-to-die clearance must be determined according to the thickness and material of the worksheet as shown in the table below.

An excessive or insufficient clearance produces large burrs on the punched part or shortens the tool life.   Determine an appropriate clearance as described below.

- The recommended clearance for punching mild steel is 20 to 25% of the worksheet thickness.
- The recommended clearance for punching aluminum is 15 to 20% of the worksheet thickness.
- The recommended clearance for punching stainless steel is 25 to 30% of the worksheet thickness.

Example:

Calculate the clearance for punching a 1.2-mm thick mild steel worksheet as follows:

1.2 mm $\times$ 0.2 = 0.24 mm, 1.2 mm $\times$ 0.25 = 0.3 mm
Thus, the recommended clearance is 0.24 to 0.3 mm.

Worksheet thickness (mm)	Recommended clearance (mm)		
	Mild steel	Aluminum	Stainless steel
0.8	0.15 to 0.2	0.15	0.2 to 0.24
1.0	0.2 to 0.25	0.15 to 0.2	0.25 to 0.3
1.5	0.3 to 0.375	0.225 to 0.4	0.375 to 0.45
2.0	0.4 to 0.5	0.3 to 0.4	0.5 to 0.6
2.5	0.5 to 0.625	0.375 to 0.5	0.625 to 0.75
3.0	0.6 to 0.75	0.45 to 0.6	0.75 to 0.9
3.2	0.65 to 0.8	0.48 to 0.64	0.8 to 0.96
3.5	0.7 to 0.875	0.525 to 0.7	0.875 to 1.05
4.0	0.8 to 1.0	0.6 to 0.8	1.0 to 1.2
4.5	0.9 to 1.125	0.675 to 0.9	1.2 to 1.35
5.0	1.0 to 1.25	0.75 to 1.0	——
5.5	1.1 to 1.375	0.825 to 1.1	——
6.0	1.2 to 1.5	0.9 to 1.2	——

PUNCHING CAPACITY

Maximum punchable hole diameter

The maximum punchable hole diameter is determined by the material and thickness of the worksheet.   The punching force required is generally calculated by the following formula:

$$P \text{ (kN)} = \frac{A \text{ (mm)} \times t \text{ (mm)} \times \tau \text{ (N/mm}^2)}{1000}$$

or

$$P \text{ (metric ton)} = \frac{A \text{ (mm)} \times t \text{ (mm)} \times \tau \text{ (kgf/mm}^2)}{1000}$$

where,   P: Force required

   A: Cut edge length

   t: Thickness of worksheet

   τ: Shearing strength of worksheet

If P does not exceed the press capacity (300 kN or 30 metric tons), the worksheet is punchable.

Example:

Calculate the maximum punchable hole diameter for a 6-mm thick and 400-N/mm^2 shearing strength mild steel worksheet as follows:

A = P ÷ (t × τ) × 1000 = 300000 ÷ (6 × 400) = 125 mm

125 ÷ π = 39.788…

Thus, the maximum punchable hole diameter is about 39.7 mm (the cut edge length is about 125 mm).

The following graph shows the maximum punchable hole diameters for a variety of worksheet thicknesses.   The graph is based on the calculations made for a mild steel with a shearing strength of 400 N/mm² (40 kgf/mm²).

Thickness = 3.2 mm   Thickness = 2.3 mm

Thickness = 1.6 mm

Thickness = 1.2 mm

Thickness = 1.0 mm

Thickness = 0.8 mm

PRESS CAPACITY (kN)

300

200

100

156mm   217mm   312mm

40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360   CUT EDGE LENGTH (mm)

10   20   30   40   50   60   70   80   90   100   110   DIAMETER (mm)

CUT EDGE LENGTH L:

d

L = π d

b

a
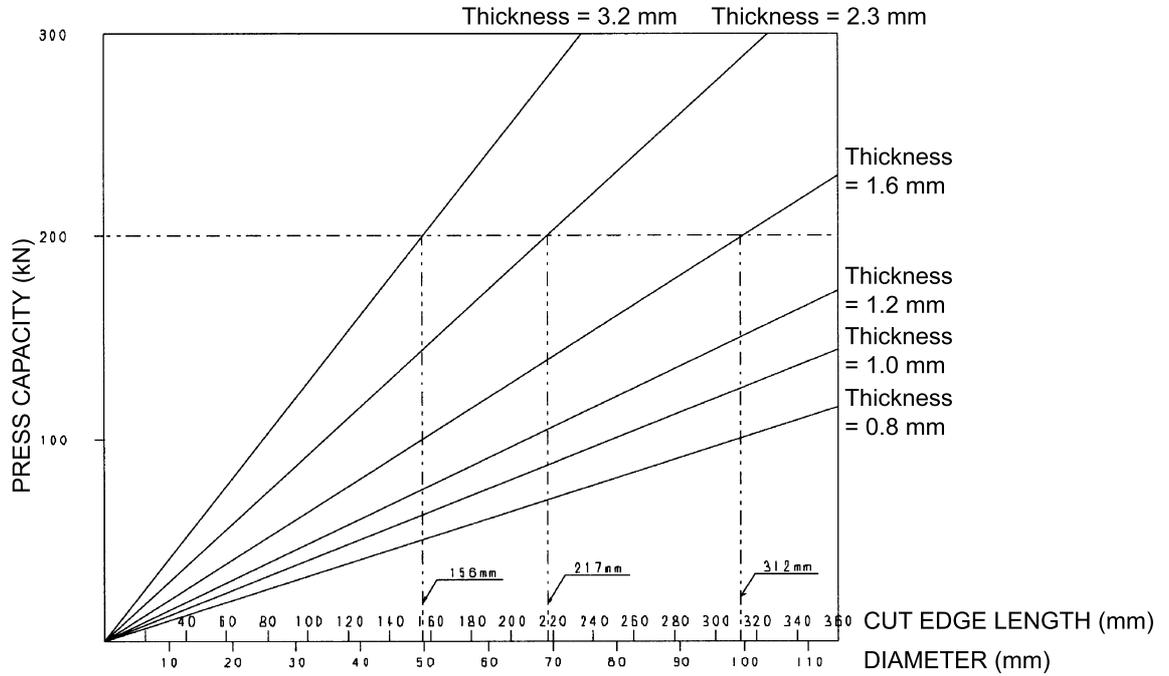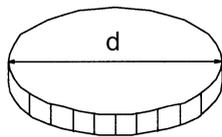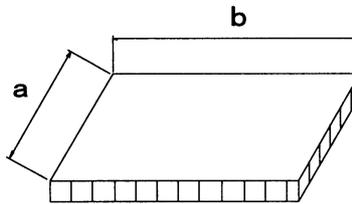
L = 2 （a + b）

Minimum punchable hole diameter

The following table shows the minimum diameters of punchable holes.

Material	Minimum punchable hole diameter
Mild steel	1.0 x t
Aluminum	1.0 x t
Stainless steel	2.0 x t

t : Thickness of worksheet

Example:

The minimum punchable hole diameter for 2.3-mm thick mild steel is:

1.0 x 2.3 mm = 2.3 mm

Punching heavy worksheets

⚠ WARNING	● Never use tools above their allowable pressure (see the table below). Otherwise they may break and fly off.

When punching heavy worksheets, use tools one size larger than tools used for punching holes of corresponding diameter in light worksheets.

ALLOWABLE PRESSURE OF TOOLS

Tool size	Standard-type tool	Air blow-type tool	Hole diameter for air blow-type tool
Type A (1/2")	60 kN (6 tonf)	45 kN (4.5 tonf)	SPC 3.2 t ϕ11.5 SPC 2.0 t ϕ11.5
Type B (1-1/4")	170 kN (17 tonf)	160 kN (16 tonf)	SPC 6.0 t ϕ21.0 SPC 3.0 t ϕ28.0

t: Thickness of worksheet (mm)

DIAMETER OF HOLES PUNCHABLE AT ALLOWABLE PRESSURE

The following tables show the diameters of punchable holes when the shearing strength is assumed to be 400 N/mm^2 (40 kgf/mm^2) for mild steel and 600 N/mm^2 (60 kgf/mm^2) for stainless steel.

Unit: mm

Worksheet thickness	Type A (1/2") Standard		Type A (1/2") Air blow	
	Mild steel	Stainless steel	Mild steel	Stainless steel
1.0	φ 12.7	φ 12.7	φ 12.7	φ 12.7
2.0	φ 12.7	φ 12.7	φ 12.7	φ 11.5
3.0	φ 12.7	φ 10.5	φ 12.0	φ 8.0
4.0	φ 11.5	φ 8.0	φ 9.0	NG
5.0	φ 9.5	NG	φ 7.0	NG
6.0	φ 8.0	NG	NG	NG

Unit: mm

Worksheet thickness	Type B (1-1/4") Standard		Type B (1-1/4") Air blow	
	Mild steel	Stainless steel	Mild steel	Stainless steel
1.0	φ 31.7	φ 31.7	φ 30.0	φ 30.0
2.0	φ 31.7	φ 31.7	φ 30.0	φ 30.0
3.0	φ 31.7	φ 30.0	φ 30.0	φ 28.0
4.0	φ 31.7	φ 22.5	φ 30.0	φ 25.0
5.0	φ 27.0	φ 18.0	φ 25.5	φ 17.0
6.0	φ 23.0	φ 15.0	φ 21.0	φ 14.0

Example:

Under the processing conditions shown in the table below, the diameter of punchable holes corresponds to the size of Type B tools (1-1/4"), but use one size larger Type C (2") tools.

Worksheet material	Worksheet thickness (mm)	Hole diameter (mm)
Mild steel (400 N/mm^2)	6.0	12.8 to 31.7
	4.5	12.8 to 31.7
Stainless steel (600 N/mm^2)	4.0	12.8 to 31.7

ΩMADA

Appendix

Safety Data Sheets

MATERIAL SAFETY DATA SHEET

Note: Read and understand Material Safety Data Sheet before handling or disposing of product.

SECTION 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

NAME OF PRODUCT	AMADA GREASE EPNo.O
PRODUCT USE	Lubricating grease
NAME OF COMPANY	AMADA Co. Ltd.
Address	200 Ishida, Isehara, Kanagawa, Japan
DEPARTMENT	Quality Assurance Dept.
	TEL 0463-96-3423　　　　FAX　0463-96-3403
EMERGENCY CONTACT	Oil Service Division　Development Group
	TEL 048-281-7767　　　　FAX　048-281-7768
DOCUMENT PREPARED & UPDATED	Updated : Oct. 2002

SECTION 2. COMPOSITON/INFORMATION ON INGREDIENTS

COMPOSITION

COMPONENTS	Amount (wt%)
Highly refined petroleum oil	85～95
Thickener(Lithium soap)	＜10
Additives	＜10

JAPANESE COMPOSITION INFORMATION

Labour Safety Law :	Amount (wt%)
169 Mineral oil	90～100%

PRTR Law :	Amount (wt%)
Not Applicable	

SECTION 3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Warning statement:

　Caution!　Prolonged or repeated contact with skin may cause irritation in some cases.

Precautionary Measures:

　　Avoid breathing vapor and mist. Keep container closed.
　　Avoid contact with eyes, skin, and clothing.
　　Wash thoroughly after handling. Keep away from heat.

Potential health effect:

Eyes:	May cause minor irritation.
Skin:	May cause minimal skin irritation.
Inhalation:	Vapor or mist, in excess of permissible concentrations, or in unusually high concentrations generated from spraying, heating the material, or as from exposure in poorly ventilated areas or confined spaces, may cause irritation of the nose and throat, headache, nausea, and drowsiness.
Ingestion:	May cause abdominal discomfort, nausea, or diarrhea.
Sensitization properties:	Unknown
Chronic Properties:	If prolonged exposure occurs, nausea, headache, diarrhea, and physical discomfort.
Other remarks:	None

A-2

SECTION 4. FIRST AID MAESURES

Eyes: Flush immediately with water for at least 15 minutes. Get immediate medical attention.
Skin: Wash with soap and water. Get medical attention if irritation develops.
                           Launder contaminated clothing before reuse.
Inhalation: Remove exposed person to fresh air if adverse effects are observed.
Ingestion: Do not make person vomit unless directed to do so by medical personnel.
Note to physician: Treat symptomatically.

SECTION 5. FIRE FIGHTIN MEASURES

Flash point (Typical), ℃   Not Determined.
Autoignition tempt., ℃   Not Determined.
Flammability limits: Not Determined.
Extinguishing media: CO_2, dry chemical, or foam.
Special fire fighting procedures: Recommend wearing self-contained breathing apparatus. Water may
              cause   splattering. Material will float on water.
Unusual fire & explosion hazards: Toxic fumes, gases or vapors may evolve on burning.
Explosion data: Material does not have explosive properties.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Procedures in Case of Accidental Release, Breakage or Leakage:
Stop the source of the leak or release. Clean up releases as soon as possible. Contain liquid to prevent
further contamination of soil, surface water or groundwater. Clean up small spills using appropriate
techniques such as sorbent materials or pumping.
Where feasible and appropriate, remove contaminated soil. Follow prescribed procedures for reporting and
responding to larger releases.

SECTION 7. HANDLING AND STRAGE

Do not weld, heat or drill container. Replace cap or bung. Emptied container still contains hazardous material
which may ignite with explosive violence if heated sufficiently.
Minimum feasible handling temperatures should be maintained.
Periods of exposure to high temperatures should be minimized.
Water contamination should be avoided.
CAUTION: Do not use pressure to empty drum or drum may rupture with explosive force.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Eye Protection: Chemical type goggles or face shield optional.
Skin Protection: Avoid prolonged or frequently repeated skin contact by wearing impervious
                                       protective clothing including gloves.
Respiratory Protection: Wear a breathing mask.
Ventilation: No special ventilation is usually necessary. However, if operating
                                       conditions create high air borne concentrations of this material,
                                       special ventilation may be needed.
Other clothing and Equipment: No special clothing or equipment is usually necessary,
Work practices, hygienic practices: No information is available.
Other handling and storage requirements: No information is available.
Protective measures during maintenance of contaminated equipment: No Data Available.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Odor		Slight odor
Appearance		brown paste
Boiling point	℃	No Data Available
Solubility		Insoluble in water
Density	@15℃, g/cm^3	0.91
Pour point	℃	No Data Available

SECTION 10. STABILITY AND REACTIVITY

Stability:	Stable
Conditions to Avoid:	See the Handling and storage section for further details.
Incompatibility (materials to avoid):	Acids. Oxidizing agents. Halogens and halogenated compounds.
Hazardous Polymerization:	Will not occur
Thermal decomposition:	Smoke, carbon monoxide, aldehydes and other products of incomplete combustion. Hydrogen sulfide and alkyl mercaptans and sulfides may also bereleased. Under combustion conditions, oxides of the following elements will be formed: Calcium, Sulfur, Zinc.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute Oral:	No Data Available:	
Dermal:	No Data Available:	
Carcinogen:	OSHA:	This material is listed as Group 3 by IARC.
(Base oil)	EU:	The classification as a carcinogen need not apply.

SECTION 12. ECOLOGICAL INFORMATION

Biodegradation:	No Data Available
Environmental fate:	This material is not expected to present any environmental problems other than those associated with oil spills.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste Disposal Method:
Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations. Contact local environmental or health authorities for approved disposal of this material.

SECTION 14. TRANSPORT INFORMATION

The description shown may not apply to all shipping situations.

DOT Proper Shipping Name:	Not applicable.
IMDG Proper Shipping Name:	Not applicable.
ICAO Proper Shipping Name:	Not applicable.
TDG Proper Shipping Name:	Not applicable.
NFPA Proper name:	Class 1.
UN Number:	Not applicable.

SECTION 15. REGULATION INFORMATION

JAPANESE REGULATORY INFORMATION
(PRTR) Pollutant Release and Transfer Register.
Industrial Safety and Health Law (Article 57-2, 1, reported objects).
Description of PRTR, Law concerning examination & regulation
of manufacture etc. of chemicals, List of chemical name.
Law concerning Industrial Waste Management.
Law concerning marine pollution control and Mineral Oil Effluent Regulation.
Water Pollution Control Law: Oil effluent regulation.
Sewage Water Law: Mineral oil effluent regulation.
Fire Defense Law.

SECTION 16. OTHER INFORMATION

References:

1. Handbook of Toxic and Hazardous Chemicals and Carcinogens (2nd ed.)
2. Registry of Toxic Effects of Chemical Substances (NIOSH, 1983)

Material safety data sheets are provided as reference information on the safe handling of hazardous or
harmful materials to companies using such materials. When referring to this data sheet, companies should
remember that they must take responsibility for implementing the proper measures for their own particular
 situations. This data sheet is not a guarantee of safety.

MATERIAL SAFETY DATA SHEET

Note: Read and understand Material Safety Data Sheet before handling or disposing of product.

SECTION 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

NAME OF PRODUCT	AS－46
PRODUCT USE	Hydraulic fluid
NAME OF COMPANY	AMADA Co. Ltd.
ADDRESS	200 Ishida, Isehara, Kanagawa, Japan
DEPARTMENT	Quality Assurance Dept.
	TEL 0463-96-3423 FAX 0463-96-3403
EMERGENCY CONTACT	Oil Service Division Development Group
	TEL 048-281-7767 FAX 048-281-7768
DOCUMENT PREPARED＆UPDATED	Updated : Oct. 2004

SECTION 2. COMPOSITON/INFORMATION ON INGREDIENTS

COMPOSITION

COMPONENTS	Amount (wt%)
Highly refined petroleum oil	－
Additives	－

JAPANESE COMPOSITION INFORMATION

Labour Safety Law :	Amount (wt%)
169 Mineral oil	90～100%

PRTR Law :	Amount (wt%)
Not Applicable	

SECTION 3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
Warning statement:
   Caution!   Prolonged or repeated contact with skin may cause irritation in some cases.
Precautionary Measures:
          Avoid breathing vapor and mist. Keep container closed.
          Avoid contact with eyes, skin, and clothing.
          Wash thoroughly after handling. Keep away from heat.
Potential health effect:
   Eyes: May cause minor irritation.
   Skin: May cause minimal skin irritation.
   Inhalation: Vapor or mist, in excess of permissible concentrations, or in unusually high concentrations
                generated from spraying, heating the material, or as from exposure in poorly ventilated
                areas or confined spaces, may cause irritation of the nose and throat, headache, nausea,
                and drowsiness.
   Ingestion: May cause abdominal discomfort, nausea, or diarrhea.
   Sensitization properties: Unknown
   Chronic Properties: If prolonged exposure occurs, nausea, headache, diarrhea, and physical
                                discomfort.
   Other remarks: None

SECTION 4. FIRST AID MAESURES

Eyes:	Flush immediately with water for at least 15 minutes. Get immediate medical attention.
Skin:	Wash with soap and water. Get medical attention if irritation develops. Launder contaminated clothing before reuse.
Inhalation:	Remove exposed person to fresh air if adverse effects are observed.
Ingestion:	Do not make person vomit unless directed to do so by medical personnel.
Note to physician:	Treat symptomatically.

SECTION 5. FIRE FIGHTIN MEASURES

Flash point (Typical), ℃	220(COC)
Autoignition tempt., ℃	Not Determined.
Flammability limits:	Not Determined.
Extinguishing media:	CO_2, dry chemical, or foam.
Special fire fighting procedures: cause	Recommend wearing self-contained breathing apparatus. Water may splattering. Material will float on water.
Unusual fire & explosion hazards:	Toxic fumes, gases or vapors may evolve on burning.
Autoignition temperature:	Not determined.
Explosion data:	Material does not have explosive properties.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Procedures in Case of Accidental Release, Breakage or Leakage:
Stop the source of the leak or release. Clean up releases as soon as possible. Contain liquid to prevent further contamination of soil, surface water or groundwater. Clean up small spills using appropriate techniques such as sorbent materials or pumping.
Where feasible and appropriate, remove contaminated soil. Follow prescribed procedures for reporting and responding to larger releases.

SECTION 7. HANDLING AND STRAGE

Do not weld, heat or drill container. Replace cap or bung. Emptied container still contains hazardous material which may ignite with explosive violence if heated sufficiently.
Minimum feasible handling temperatures should be maintained.
Periods of exposure to high temperatures should be minimized.
Water contamination should be avoided.
CAUTION: Do not use pressure to empty drum or drum may rupture with explosive force.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Eye Protection:	Chemical type goggles or face shield optional.
Skin Protection:	Avoid prolonged or frequently repeated skin contact by wearing impervious protective clothing including gloves.
Respiratory Protection:	Wear a breathing mask.
Ventilation:	No special ventilation is usually necessary. However, if operating conditions create high air borne concentrations of this material, special ventilation may be needed.
Other clothing and Equipment:	No special clothing or equipment is usually necessary,
Work practices, hygienic practices:	No information is available.
Other handling and storage requirements:	No information is available.
Protective measures during maintenance of contaminated equipment:	No Data Available.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Odor		Slight odor
Appearance		L1. 0(ASTM)
Boiling point	℃	No Data Available
Solubility		Insoluble in water
Density	@15℃, g/cm^3	0.873
Pour point	℃	−27.5

SECTION 10. STABILITY AND REACTIVITY

Stability:	Stable
Conditions to Avoid:	See the Handling and storage section for further details.
Incompatibility (materials to avoid):	Acids. Oxidizing agents. Halogens and halogenated compounds.
Hazardous Polymerization:	Will not occur
Thermal decomposition:	Smoke, carbon monoxide, aldehydes and other products of incomplete combustion. Hydrogen sulfide and alkyl mercaptans and sulfides may also bereleased. Under combustion conditions, oxides of the following elements will be formed: Calcium, Sulfur, Zinc.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute Oral:	No Data Available:	
Dermal:	No Data Available:	
Carcinogen:	OSHA:	This material is listed as Group 3 by IARC.
(Base oil)	EU:	The classification as a carcinogen need not apply.

SECTION 12. ECOLOGICAL INFORMATION

Biodegradation:	No Data Available
Environmental fate:	This material is not expected to present any environmental problems other than those associated with oil spills.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste Disposal Method:
Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations. Contact local environmental or health authorities for approved disposal of this material.

SECTION 14. TRANSPORT INFORMATION

The description shown may not apply to all shipping situations.

DOT Proper Shipping Name:	Not applicable.
IMDG Proper Shipping Name:	Not applicable.
ICAO Proper Shipping Name:	Not applicable.
TDG Proper Shipping Name:	Not applicable.
NFPA Proper name:	Class 1.
UN Number:	Not applicable.

SECTION 15. REGULATION INFORMATION

JAPANESE REGULATORY INFORMATION

(PRTR) Pollutant Release and Transfer Register.
Industrial Safety and Health Law (Article 57-2, 1, reported objects).
Description of PRTR, Law concerning examination & regulation
of manufacture etc. of chemicals, List of chemical name.
Law concerning Industrial Waste Management.
Law concerning marine pollution control and Mineral Oil Effluent Regulation.
Water Pollution Control Law: Oil effluent regulation.
Sewage Water Law: Mineral oil effluent regulation.
Fire Defense Law.

SECTION 16. OTHER INFORMATION

References:

1. Handbook of Toxic and Hazardous Chemicals and Carcinogens (2nd ed.)
2. Registry of Toxic Effects of Chemical Substances (NIOSH, 1983)

Material safety data sheets are provided as reference information on the safe handling of hazardous or harmful materials to companies using such materials. When referring to this data sheet, companies should remember that they must take responsibility for implementing the proper measures for their own particular situations. This data sheet is not a guarantee of safety.

MATERIAL SAFETY DATA SHEET

Note： Read and understand Material Safety Data Sheet before handling or disposing of product.

SECTION 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

NAME OF PRODUCT	Amada AML－2
PRODUCT USE	Mist oil
NAME OF COMPANY	AMADA Co. Ltd.
ADDRESS	200 Ishida, Isehara, Kanagawa, Japan
DEPARTMENT	Quality Assurance Dept.
	TEL 0463-96-3423 FAX 0463-96-3403
EMERGENCY CONTACT	Oil Service Division Development Group
	TEL 048-281-7767 FAX 048-281-7768
DOCUMENT PREPARED＆UPDATED	Updated : Oct. 2004

SECTION 2. COMPOSITON/INFORMATION ON INGREDIENTS

COMPOSITION

COMPONENTS	Amount (wt%)
Fatty oil	－

JAPANESE COMPOSITION INFORMATION

Labour Safety Law :	Amount (wt%)
Not Applicable	－

PRTR Law :	Amount (wt%)
Not Applicable	－

SECTION 3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
Warning statement:
    Caution!   Prolonged or repeated contact with skin may cause irritation in some cases.
Precautionary Measures:
    Avoid breathing vapor and mist. Keep container closed.
    Avoid contact with eyes, skin, and clothing.
    Wash thoroughly after handling. Keep away from heat.
Potential health effect:

Eyes:	May cause minor irritation.
Skin:	May cause minimal skin irritation.
Inhalation:	Vapor or mist, in excess of permissible concentrations, or in unusually high concentrations generated from spraying, heating the material, or as from exposure in poorly ventilated areas or confined spaces, may cause irritation of the nose and throat, headache, nausea, and drowsiness.
Ingestion:	May cause abdominal discomfort, nausea, or diarrhea.
Sensitization properties:	Unknown
Chronic Properties:	If prolonged exposure occurs, nausea, headache, diarrhea, and physical discomfort.
Other remarks:	None

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SECTION 4. FIRST AID MAESURES

Eyes: Flush immediately with water for at least 15 minutes. Get immediate medical attention.
Skin: Wash with soap and water. Get medical attention if irritation develops.
                    Launder contaminated clothing before reuse.
Inhalation: Remove exposed person to fresh air if adverse effects are observed.
Ingestion: Do not make person vomit unless directed to do so by medical personnel.

Note to physician: Treat symptomatically.

SECTION 5. FIRE FIGHTIN MEASURES

Flash point (Typical), ℃   230 (COC)
Autoignition tempt., ℃   Not Determined.
Flammability limits: Not Determined.
Extinguishing media: CO_2, dry chemical, or foam.
Special fire fighting procedures: Recommend wearing self-contained breathing apparatus. Water may
       cause   splattering. Material will float on water.
Unusual fire & explosion hazards: Toxic fumes, gases or vapors may evolve on burning.
Autoignition temperature: Not determined.
Explosion data: Material does not have explosive properties.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Procedures in Case of Accidental Release, Breakage or Leakage:
Stop the source of the leak or release. Clean up releases as soon as possible. Contain liquid to prevent
further contamination of soil, surface water or groundwater. Clean up small spills using appropriate
techniques such as sorbent materials or pumping.
Where feasible and appropriate, remove contaminated soil. Follow prescribed procedures for reporting and
responding to larger releases.

SECTION 7. HANDLING AND STRAGE

Do not weld, heat or drill container. Replace cap or bung. Emptied container still contains hazardous material
which may ignite with explosive violence if heated sufficiently.
Minimum feasible handling temperatures should be maintained.
Periods of exposure to high temperatures should be minimized.
Water contamination should be avoided.
CAUTION: Do not use pressure to empty drum or drum may rupture with explosive force.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Eye Protection: Chemical type goggles or face shield optional.
Skin Protection: Avoid prolonged or frequently repeated skin contact by wearing impervious
                                protective clothing including gloves.
Respiratory Protection: Wear a breathing mask.
Ventilation: No special ventilation is usually necessary. However, if operating
                                conditions create high air borne concentrations of this material,
                                special ventilation may be needed.
Other clothing and Equipment: No special clothing or equipment is usually necessary,
Work practices, hygienic practices: No information is available.
Other handling and storage requirements: No information is available.
Protective measures during maintenance of contaminated equipment: No Data Available.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Odor		Slight odor
Appearance		Light yellow liquid
Boiling point	℃	No Data Available
Solubility		Insoluble in water
Density	@15℃, g/cm^3	0.902
Pour point	℃	＜-15

SECTION 10. STABILITY AND REACTIVITY

Stability:	Stable
Conditions to Avoid:	See the Handling and storage section for further details.
Incompatibility (materials to avoid):	Acids. Oxidizing agents. Halogens and halogenated compounds.
Hazardous Polymerization:	Will not occur
Thermal decomposition:	Smoke, carbon monoxide, aldehydes and other products of incomplete combustion. Hydrogen sulfide and alkyl mercaptans and sulfides may also be released. Under combustion conditions, oxides of the following elements will be formed: Calcium, Sulfur, Zinc.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute Oral:	No Data Available:	
Dermal:	No Data Available:	
Carcinogen:	OSHA:	This material is listed as Group 3 by IARC.
(Base oil)	EU:	The classification as a carcinogen need not apply.

SECTION 12. ECOLOGICAL INFORMATION

Biodegradation:	No Data Available
Environmental fate:	This material is not expected to present any environmental problems other than those associated with oil spills.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste Disposal Method:
Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations. Contact local environmental or health authorities for approved disposal of this material.

SECTION 14. TRANSPORT INFORMATION

The description shown may not apply to all shipping situations.

DOT Proper Shipping Name:	Not applicable.
IMDG Proper Shipping Name:	Not applicable.
ICAO Proper Shipping Name:	Not applicable.
TDG Proper Shipping Name:	Not applicable.
NFPA Proper name:	Class 1.
UN Number:	Not applicable.

SECTION 15. REGULATION INFORMATION

JAPANESE REGULATORY INFORMATION

(PRTR) Pollutant Release and Transfer Register.
Industrial Safety and Health Law (Article 57-2, 1, reported objects).
Description of PRTR, Law concerning examination & regulation
of manufacture etc. of chemicals, List of chemical name.
Law concerning Industrial Waste Management.
Law concerning marine pollution control and Mineral Oil Effluent Regulation.
Water Pollution Control Law: Oil effluent regulation.
Sewage Water Law: Mineral oil effluent regulation.
Fire Defense Law.

SECTION 16. OTHER INFORMATION

References:

1. Handbook of Toxic and Hazardous Chemicals and Carcinogens (2nd ed.)
2. Registry of Toxic Effects of Chemical Substances (NIOSH, 1983)

Material safety data sheets are provided as reference information on the safe handling of hazardous or
harmful materials to companies using such materials. When referring to this data sheet, companies should
remember that they must take responsibility for implementing the proper measures for their own particular
 situations. This data sheet is not a guarantee of safety.

MATERIAL SAFETY DATA SHEET

Note: Read and understand Material Safety Data Sheet before handling or disposing of product.

SECTION 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

NAME OF PRODUCT	AMADA GREASE SRL
PRODUCT USE	Lubricating grease
NAME OF COMPANY	AMADA Co. Ltd.
ADDRESS	200 Ishida, Isehara, Kanagawa, Japan
DEPARTMENT	Quality Assurance Dept.
TEL 0463-96-3423	FAX 0463-96-3403
EMERGENCY CONTACT	Oil Service Division Development Group
TEL 048-281-7767	FAX 048-281-7768
DOCUMENT PREPARED&UPDATED	Updated : Oct. 2004

SECTION 2. COMPOSITON/INFORMATION ON INGREDIENTS

COMPOSITION

COMPONENTS	Amount (wt%)
Synthetic ester oil	80～90
Thickener(Lithium soap)	5～15
Additives	＜5

JAPANESE COMPOSITION INFORMATION

Labour Safety Law :	Amount (wt%)
Not Applicable	

PRTR Law :	Amount (wt%)
Not Applicable	

SECTION 3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Warning statement:

    Caution!   Prolonged or repeated contact with skin may cause irritation in some cases.

Precautionary Measures:

    Avoid breathing vapor and mist. Keep container closed.

    Avoid contact with eyes, skin, and clothing.

    Wash thoroughly after handling. Keep away from heat.

Potential health effect:

Eyes:	May cause minor irritation.
Skin:	May cause minimal skin irritation.
Inhalation:	Vapor or mist, in excess of permissible concentrations, or in unusually high concentrations generated from spraying, heating the material, or as from exposure in poorly ventilated areas or confined spaces, may cause irritation of the nose and throat, headache, nausea, and drowsiness.
Ingestion:	May cause abdominal discomfort, nausea, or diarrhea.
Sensitization properties:	Unknown
Chronic Properties:	If prolonged exposure occurs, nausea, headache, diarrhea, and physical discomfort.
Other remarks:	None

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SECTION 4. FIRST AID MAESURES

Eyes:	Flush immediately with water for at least 15 minutes. Get immediate medical attention.
Skin:	Wash with soap and water. Get medical attention if irritation develops.
	Launder contaminated clothing before reuse.
Inhalation:	Remove exposed person to fresh air if adverse effects are observed.
Ingestion:	Do not make person vomit unless directed to do so by medical personnel.
Note to physician:	Treat symptomatically.

SECTION 5. FIRE FIGHTIN MEASURES

Flash point (Typical), ℃	Not Determined.
Autoignition tempt., ℃	Not Determined.
Flammability limits:	Not Determined.
Extinguishing media:	CO_2, dry chemical, or foam.
Special fire fighting procedures: cause	Recommend wearing self-contained breathing apparatus. Water may splattering. Material will float on water.
Unusual fire & explosion hazards:	Toxic fumes, gases or vapors may evolve on burning.
Explosion data:	Material does not have explosive properties.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Procedures in Case of Accidental Release, Breakage or Leakage:
Stop the source of the leak or release. Clean up releases as soon as possible. Contain liquid to prevent further contamination of soil, surface water or groundwater. Clean up small spills using appropriate techniques such as sorbent materials or pumping.
Where feasible and appropriate, remove contaminated soil. Follow prescribed procedures for reporting and responding to larger releases.

SECTION 7. HANDLING AND STRAGE

Do not weld, heat or drill container. Replace cap or bung. Emptied container still contains hazardous material which may ignite with explosive violence if heated sufficiently.
Minimum feasible handling temperatures should be maintained.
Periods of exposure to high temperatures should be minimized.
Water contamination should be avoided.
CAUTION: Do not use pressure to empty drum or drum may rupture with explosive force.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Eye Protection:	Chemical type goggles or face shield optional.
Skin Protection:	Avoid prolonged or frequently repeated skin contact by wearing impervious protective clothing including gloves.
Respiratory Protection:	Wear a breathing mask.
Ventilation:	No special ventilation is usually necessary. However, if operating conditions create high air borne concentrations of this material, special ventilation may be needed.
Other clothing and Equipment:	No special clothing or equipment is usually necessary,
Work practices, hygienic practices:	No information is available.
Other handling and storage requirements:	No information is available.
Protective measures during maintenance of contaminated equipment:	No Data Available.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Odor		Slight odor
Appearance		Light brown paste
Boiling point	℃	No Data Available
Solubility		Insoluble in water
Density	@15℃, g/cm^3	0.97
Pour point	℃	No Data Available

SECTION 10. STABILITY AND REACTIVITY

Stability:	Stable
Conditions to Avoid:	See the Handling and storage section for further details.
Incompatibility (materials to avoid):	Acids. Oxidizing agents. Halogens and halogenated compounds.
Hazardous Polymerization:	Will not occur
Thermal decomposition:	Smoke, carbon monoxide, aldehydes and other products of incomplete combustion. Hydrogen sulfide and alkyl mercaptans and sulfides may also bereleased. Under combustion conditions, oxides of the following elements will be formed: Calcium, Sulfur, Zinc.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute Oral:	No Data Available:
Dermal:	No Data Available:
Carcinogen:	Not listed IARC, NTP, ACGIH

SECTION 12. ECOLOGICAL INFORMATION

Biodegradation:	No Data Available
Environmental fate:	This material is not expected to present any environmental problems other than those associated with oil spills.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste Disposal Method:
Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations. Contact local environmental or health authorities for approved disposal of this material.

SECTION 14. TRANSPORT INFORMATION

The description shown may not apply to all shipping situations.

DOT Proper Shipping Name:	Not applicable.
IMDG Proper Shipping Name:	Not applicable.
ICAO Proper Shipping Name:	Not applicable.
TDG Proper Shipping Name:	Not applicable.
NFPA Proper name:	Class 1.
UN Number:	Not applicable.

SECTION 15. REGULATION INFORMATION

JAPANESE REGULATORY INFORMATION

(PRTR) Pollutant Release and Transfer Register.
Industrial Safety and Health Law (Article 57-2, 1, reported objects).
Description of PRTR, Law concerning examination & regulation
of manufacture etc. of chemicals, List of chemical name.
Law concerning Industrial Waste Management.
Law concerning marine pollution control and Mineral Oil Effluent Regulation.
Water Pollution Control Law: Oil effluent regulation.
Sewage Water Law: Mineral oil effluent regulation.
Fire Defense Law.

SECTION 16. OTHER INFORMATION

References:

1. Handbook of Toxic and Hazardous Chemicals and Carcinogens (2nd ed.)
2. Registry of Toxic Effects of Chemical Substances (NIOSH, 1983)

Material safety data sheets are provided as reference information on the safe handling of hazardous or harmful materials to companies using such materials. When referring to this data sheet, companies should remember that they must take responsibility for implementing the proper measures for their own particular situations. This data sheet is not a guarantee of safety.

Safety Data Sheet

SHELL TELLUS OIL SX-Z

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY

Product name:	SHELL TELLUS OIL SX-Z
Product type:	Hydraulic oil
Supplier:	Showa Shell Sekiyu K.K.
Address:	Dalba Frontier Building.3-2,Dalba 2 Chome, Mlnato-ku,Tokyo 135,JAPAN

Contact numbers:

Telephone:	03-5531-5766
Telex:	J 22373
Fax:	03-5531-5768

Emergency telephone number:

Showa Shell Seklyu K.K.	03-5531-5766

2. COMPOSITION/INFORMATION ON INGREDIENTS

Preparatlon description:	Blend of synthetic hydrocarbons and addltives.
Dangerous components/constituents:	On the basls of avallable Information, the components of thls preparatlon are not expected to impart hazardous propertles to this product.

3. HAZARDS IDENTIFICATION

Human health hazards:	No speclflc hazards under normal use condltlons. Prolonged or repeated exposure may glve rise to dermatltls. Used product may contain harmful impurltles.
Safety hazards:	Not classIfled as flammable, but wIll burn.
Envlronmental hazards:	Not readily biodegradable. Expected to have a high potential to bloaccumulate.
Other Information:	Not classified as dangerous for supply or conveyance.

4. FIRST AID MEASURES

Symptoms and effects:	Not expected to give rise to an acute hazard under normal condltlons of use.
First Ald - Inhalatlon:	In the unllkely event of dizziness or nausea, remove casualty to fresh air. If symptoms perslst, obtaln medlcal attentlon.
Flrst Ald - Skln:	Remove contaminated clothing and wash affected skln wlth soap and water. If perslstent Irrltatlon occurs, obtain medical attention.

If high pressure injection injuries occur, obtain medical attention immediately.

First Aid - Eye: Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.

First Aid - Ingestion: Wash out mouth with water and obtain medical attention. DO NOT INDUCE VOMITING.

Advice to physicians: Treat symptomatically. Aspiration into the lungs may result in chemical pneumonitis. Dermatitis may result from prolonged or repeated exposure.

5. FIRE FIGHTING MEASURES

Specific hazards: Combustion is likely to give rise to a complex mixture of airborne solid and liquid particulates and gases, including carbon monoxide, oxides of sulphur, and unidentified organic and inorganic compounds.

Extinguishing media: Foam and dry chemical powder. Carbon dioxide, sand or earth may be used for small fires only.

Unsuitable extinguishing media: Water in a jet. Use of Halon extinguishers should be avoided for environmental reasons.

Protective equipment: Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Avoid contact with: skin and eyes.

Personal protection: Wear impermeable gloves and boots.

Environmental precautions: Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers. Inform local authorities if this cannot be prevented.

Clean-up methods - small spillage: Absorb liquid with sand or earth. Sweep up and remove to a suitable, clearly marked container for disposal in accordance with local regulations.

Clean-up methods - large spillage: Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an absorbent. Dispose of as for small spills.

7. HANDLING AND STORAGE

Handling:	When handling product in drums, safety footwear should be worn and proper handling equipment should be used. Prevent spillages.
Storage:	Keep in a cool, dry, well-ventilated place. Use properly labelled and closable containers. Avoid direct sunlight, heat sources, and strong oxidizing agents.
Storage temperature:	0°C minimum to 50°C maximum.
Recommended materials:	For containers or container linings, use: mild steel or high density polyethylene.
Unsuitable materials:	For containers or container linings, avoid: PVC.
Other information:	Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering control measures:	Use local exhaust ventilation if there is a risk of inhalation of vapours, mists or aerosols.
Occupational exposure standards:	No data available.
Hygiene measures:	Wash hands before eating, drinking, smoking and using the toilet.
Respiratory protection:	Not normally required. If oil mist cannot be controlled, a respirator fitted with an organic vapour cartridge combined with a particulate pre-filter should be used.
Hand protection:	PVC or nitrile rubber gloves.
Eye protection:	Wear safety glasses or full face shield if splashes are likely to occur.
Body protection:	Minimise all forms of skin contact. Wear overalls to minimise contamination of personal clothing. Launder overalls and undergarments regularly.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Liquid at ambient temperature.
Colour:	Pale yellow liquid
Odour:	Characteristic mineral oil
Initial boiling point:	No data available.
Vapour pressure:	< 0.5 Pa at 20°C
Density:	See Table 1
Vapour density (air=1):	> 1 at 20°C
Pour point:	See Table 1
Flash point:	See Table 1
Flammability limit - lower:	1% V/V (typical)

Flammability limit - upper:	10% V/V (typical)
Auto-ignition temperature:	No data available.
Solubility in water:	Negligible

10. STABILITY/REACTIVITY

Stability:	Stable
Conditions to avoid:	Extremes of temperature and direct sunlight.
Materials to avoid:	Strong oxidizing agents
Hazardous decomposition products:	Hazardous decomposition products are not expected to form during normal storage.

11. TOXICOLOGICAL INFORMATION

Basis for assessment:	Toxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the toxicology of similar products.
Acute toxicity - oral:	No data available.
Acute toxicity - dermal:	No data available.
Acute toxicity - inhalation:	No data available.
Eye Irritation:	Expected to be slightly Irritant.
Skin irritation:	Expected to be slightly irritant.
Respiratory irritation:	If mists are inhaled, slight irritation of the respiratory tract may occur.
Skin sensitization:	Not expected to be a skin sensitizer
Carcinogenicity:	Product is based on mineral oils of types shown to be non-carcinogenic in animal skin-painting studies. Other components are not known to be associated with carcinogenic effects.
Mutagenicity:	Not considered to be a mutagenic hazard.
Other Information:	Prolonged and/or repeated contact with this product can result in defatting of the skin, particularly at elevated temperatures. This can lead to irritation and possibly dermatitis, especially under conditions of poor personal hygiene. Skin contact should be minimised.
	Used oils may contain harmful impurities that have accumulated during use. The concentration of such impurities will depend on use and they may present risks to health and the environment on disposal. ALL used oil should be handled with caution and skin contact avoided as far as possible.

12. ECOLOGICAL INFORMATION

Basis for assessment: Ecotoxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the ecotoxicology of similar products.

Mobility: Liquid under most environmental conditions. Floats on water. If it enters soil, it will adsorb to soil particles and will not be mobile.

Persistence/degradability: No data available.

Bioaccumulation: Has the potential to bioaccumulate.

Ecotoxicity: No data available.

13. DISPOSAL CONSIDERATIONS

Waste disposal: Recycle or dispose of in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the contractor to deal satisfactorily with this type of product should be established beforehand.

Container disposal: 200 litre drums should be emptied and returned to the supplier or sent to a drum reconditioner without removing or defacing markings or labels.

Non-reusable small metal and plastic containers should be recycled where possible, or disposed of as domestic refuse.

14. TRANSPORT INFORMATION

Not dangerous for conveyance under UN, IMO, ADR/RID and IATA/ICAO codes.

15. REGULATORY INFORMATION

EC Classification: Not classified as Dangerous under EC criteria

EINECS (EC): All components listed or polymer exempt.

TSCA (USA): All components listed.

MITI(JAPAN): All components listed.

16. OTHER INFORMATION

Uses and restrictions:	For hydraulic applications requiring an anti-wear oil.
Technical contact point:	Technical Support Team , Lubricants & Bitumen Division

Technical contact number:

Telephone:	03-5531-5766
Telex:	J 22373
Fax:	03-5531-5768

This Information is based on our current knowledge and is Intended to describe the product for the purposes of health, safety and environmental requirements only.   It should not be construed as guaranteeing any specific property of the product.

TABLE 1: SHELL TELLUS OIL SX-Z

SHELL TELLUS OIL SX-Z	32	46
Density, kg/m^3 at 15°C	831	834
Pour point, °C	<-40.0	<-40.0
Flash point, °C (COC)	258	262

SAFETY DATA SHEET   SHELL TELLUS OIL C32

1. NAME

PRODUCT: Tellus Oil C32

CHEMICAL NAME: Petroleum Hydrocarbons

2. PRODUCT/INGREDIENT

	percent	toxicity
Tellus Oil C32	100	not available
Severely refined petroleum hydrocarbons	ca.99	oil mist, TWA ACGIH/OSHA 5 mg/m^3 oral LD_{50} > 15 g/kg(rat) estimated

Based upon data available to Showa Shell this product is not considered to be carcinogenic under OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910, 1200) (IARC MONOGRAPH 33).

3. HEALTH INFORMATION

ROUTE OF ENTRY:

Eye contact: Expected, at worst, to be minimally irritating to the skin.

Skin contact: Prolonged or repeated skin contact may cause skin irritation.

Inhalation: No specific information.

Ingestion: No specific information.

SIGNS AND SYMPTOMS:

Irritation as above.

AGGRAVATED MEDICAL CONDITIONS:

Pre-existing skin disorder may be aggravated by exposure to this product.

OTHER HEALTH EFFECTS:

This specific product has not been tested in long-term chromic exposure tests.
Lubricating oils are generally considered to be a low order of acute toxicity to humans and experimental animals.   However, the handling procedures and safety precautions in this MSDS should be followed to minimize employee' exposure.

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4. OCCUPATIONAL EXPOSURE LIMITS

	OSHA		ACGIH		OTHER
PEL/TWA	PEL/CEILING		TLV/TWA	TLV/STEL	
			5 mg/m^3	…	
	(OIL MIST, mineral		Severely refined)		

5. EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT:

Flush with water for 15 minutes while holding eyelids open.   Get medical attention.

SKIN CONTACT:

Remove contaminated clothing and wipe excess off.   Wash with soap and water or waterless hand cleaner followed by soap and water.   Do not re-use clothing until thoroughly cleaned.   If irritation persists, get medical attention promptly to prevent serious damage; do not wait for symptoms to develop.

INHALATION:

Remove victim to fresh air and provide oxygen if breathing is difficult.   Get medical attention.

INGESTION: Get medical attention.

6. SUPPLEMENTAL INFORMATION

Not identified.

7. PHYSICAL DATA

Boiling Point °C: NA

Specific Gravity: ca.   0.87 at 15/4 °C

% Volatile by wt: NA

Vapour Density: > 1 (air = 1)

Appearance: pale yellow liquid

Solubility in water: negligible

Odour: characteristic odour

8. FIRE AND EXPLOSION HAZARDS

Flash Point (COC) °C: 226

Flammable Limit % vol in air: NA

EXTINGUISHING MEDIA: Use water fog, dry chemical or CO_2.

SPECIAL FIRE FIGHTING PROCEDURES AND PRECAUTIONS:

Do not enter confined fire space without proper protective equipment including a NIOSH approved self-contained breathing apparatus.   Cool fire exposed container, surrounding equipment and structures with water.

9. REACTIVITY

Stability: Stable

Hazardous polymerization: Will not occur

Conditions and Materials to avoid: Strong oxidizers

Hazardous decomposition product:
NOx, SOx, CO, and other unidentified oxygenates can be formed during combustion.

10. EMPLOYEE PROTECTION

RESPIRATORY PROTECTION:

A NIOSH approved respiratory protection equipment should be used when vapour or mist concentration exceeds applicable standards.

PROTECTIVE CLOTHING:

Use oil resistant gloves and other clothing as minimize skin contact.

VENTILATION: Mechanical equipment

EYE PROTECTION:

Normal industrial eye protection equipment should be employed.

11. ENVIRONMENTAL PROTECTION

SPILL OR LEAK PROCEDURE:

Prevent entry into sewers and waterways.   Pick up free liquid for disposal.   Absorb small amount on inert material for disposal.

WASTE DISPOSAL:

Dispose of in an appropriate disposal facility in compliance with appropriate regulations.

12. SPECIAL PRECAUTIONS

Store in a cool, dry place with adequate ventilation.   Keep away from open flames and high temperature.   Minimize skin contact.   Wash with soap and water before eating, drinking, smoking or using toilet facilities.

Launder contaminated clothing before using.   Discard leather goods if they cannot be decontaminated.   Wash before eating or smoking. Observe good personal hygiene.

13. OTHER REGULATORY

All components of this product are listed on the EPA/TSCA inventory of chemical substances.

The information contained herein is based on the data available to Showa Shell and is believed to be correct.   However, Showa Shell makes no warranty, expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof.   Showa Shell assumes no responsibility for injury from the use of the product described herein.

DATE PREPARED: 22nd August, 1994

SAFETY DATA SHEET   SHELL ALVANIA GREASE 2

1. NAME

PRODUCT: SHELL ALVANIA GREASE 2

CHEMICAL NAME: LUBRICATING GREASE

2. PRODUCT/INGREDIENT

	percent	toxicity
SHELL ALVANIA GREASE 2	100	not available
Solvent Refined petroleum hydrocarbons	balance	oil mist, TWA ACGIH/OSHA 5 mg/m^3 estimated oral LD_{50} > 5 g/kg (rat) estimated dermal LD_{50} > 2 g/kg
Lithium hydroxystearate	ca. 9	
Aromatic Amine	1	oral LD_{50} 1.6 g/kg (rat)
Sodium Nitrite	0.8	oral LD_{50} 180 mg/kg (rat)

Based upon data available to Showa Shell this product is not hazardous under OSHA HAZARD COMMUNICATION (29 CFR 1910, 1200)

3. HEALTH INFORMATION

ROUTE OF ENTRY:

Eye contact: May be irritating to the eyes.

Skin contact: Prolonged or repeated skin contact may cause skin irritation.

Inhalation: No specific information.

Ingestion: No specific information.

SIGNS AND SYMPTOMS:

Irritation as above.

AGGRAVATED MEDICAL CONDITIONS:

Pre-existing skin disorder may be aggravated by exposure to this product.

OTHER HEALTH EFFECTS:

This specific product has not been tested in long-term chronic exposure tests.   The handling procedures and safety precautions in this MSDS should be followed to minimize employee' exposure.

4. OCCUPATIONAL EXPOSURE LIMITS

OSHA		ACGIH		OTHER
PEL/TWA	PEL/CEILING	TLV/TWA	TLV/STEL	

No OSHA/PEL or ACGIH/TLV has been established.

5. EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT:

Flush with water for 15 minutes while holding eyelids open.   Get medical attention.

SKIN CONTACT:

Remove contaminated clothing and wipe excess off.   Wash with soap and water or waterless hand cleaner followed by soap and water.   Do not re-use clothing until thoroughly cleaned.   If irritation persists, get medical attention promptly to prevent serious damage; do not wait for symptoms to develop.

INHALATION:

Remove victim to fresh air and provide oxygen if breathing is difficult.   Get medical attention.

INGESTION: Get medical attention.

6. SUPPLEMENTAL INFORMATION

Not identified.

7. PHYSICAL DATA

Boiling Point °C: NA

Specific Gravity: NA

Vapour Pressure: NA

Vapour Density: NA

Appearance & Odour: amber color, slight odour grease

Solubility in water: insoluble

Melting Point: NA

8. FIRE AND EXPLOSION HAZARDS

Flash Point (COC) °C: 210 for base oil

Flammable Limit % vol in air: LEL:NA ; UEL:NA

EXTINGUISHING MEDIA:

Use water fog, dry chemical or CO_2. Do not use direct stream of water. Product will float and can be reignited on surface water.

SPECIAL FIRE FIGHTING PROCEDURES AND PRECAUTIONS:

Do not enter confined fire space without proper protective equipment including a NIOSH approved self-contained breathing apparatus. Cool fire exposed container, surrounding equipment and structures with water.

9. REACTIVITY

Stability: Stable

Hazardous polymerization: Will not occur

Conditions and Materials to avoid: Strong oxidizers

Hazardous decomposition product:
NOx, SOx, COx, and other unidentified oxygenates can be formed during combustion.

10. EMPLOYEE PROTECTION

RESPIRATORY PROTECTION:

A NIOSH approved respiratory protection equipment should be used when vapour or mist concentration exceeds applicable standards.

PROTECTIVE CLOTHING:

Use oil resistant gloves and other clothing as minimize skin contact.

11. ENVIRONMENTAL PROTECTION

SPILL OR LEAK PROCEDURE:

Scoop up excess grease. Clean area with appropriate cleaner.

WASTE DISPOSAL:

Dispose of in an appropriate disposal facility in compliance with appropriate regulations.

12. SPECIAL PRECAUTIONS

Store in a cool, dry place with adequate ventilation. Keep away from open flames and high temperature. Minimize skin contact. Wash with soap and water before eating, drinking, smoking or using toilet facilities.

Launder contaminated clothing before using. Discard leather goods if they cannot be decontaminated. Wash before eating or smoking. Observe good personal hygiene.

13. OTHER REGULATORY CONTROL

All components of this product are listed on the EPA/TSCA inventory of chemical substances.

The information contained herein is based on the data available to Showa Shell and is believed to be correct. However, Showa Shell makes no warranty, expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. Showa Shell assumes no responsibility for injury from the use of the product described herein.

DATE PREPARED: 8th June, 1993

SAFETY DATA SHEET   SHELL ALVANIA EP GREASE R0

1. NAME

PRODUCT: SHELL ALVANIA EP GREASE R0

CHEMICAL NAME: LUBRICATING GREASE

2. PRODUCT/INGREDIENT

	percent	toxicity
SHELL ALVANIA EP GREASE R0	100	not available
Solvent Refined petroleum hydrocarbons	balance	oil mist, TWA ACGIH/OSHA 5 mg/m^3 oral LD$_{50}$ > 5 g/kg (rat) estimated dermal LD$_{50}$ > 28 g/kg, TWA 100 mg/m^3
Lithium hydroxystearate	ca. 5	
Lead Naphthenate	2	oral LD$_{50}$ 5.1 g/kg (rat)
Sulphurized Fatty Oil	3	oral LD$_{50}$ 20 g/kg (rat)

Based upon data available to Showa Shell this product is not hazardous under OSHA HAZARD COMMUNICATION (29 CFR 1910, 1200)

3. HEALTH INFORMATION

ROUTE OF ENTRY:

Eye contact: May be irritating to the eyes.

Skin contact: Prolonged or repeated skin contact may cause skin irritation.

Inhalation: No specific information.

Ingestion: No specific information.

SIGNS AND SYMPTOMS:

Irritation as above.

AGGRAVATED MEDICAL CONDITIONS:

Pre-existing skin disorder may be aggravated by exposure to this product.

OTHER HEALTH EFFECTS:

This specific product has not been tested in long-term chronic exposure tests.   The handling procedures and safety precautions in this MSDS should be followed to minimize employee' exposure.

4. OCCUPATIONAL EXPOSURE LIMITS

OSHA		ACGIH		OTHER
PEL/TWA	PEL/CEILING	TLV/TWA	TLV/STEL	

No OSHA/PEL or ACGIH/TLV has been established.

5. EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT:

Flush with water for 15 minutes while holding eyelids open.   Get medical attention.

SKIN CONTACT:

Remove contaminated clothing and wipe excess off.   Wash with soap and water or waterless hand cleaner followed by soap and water.   Do not re-use clothing until thoroughly cleaned.   If irritation persists, get medical attention promptly to prevent serious damage; do not wait for symptoms to develop.

INHALATION:

Remove victim to fresh air and provide oxygen if breathing is difficult.   Get medical attention.

INGESTION: Get medical attention.

6. SUPPLEMENTAL INFORMATION

Not identified.

7. PHYSICAL DATA

Boiling Point °C: NA

Specific Gravity: NA

Vapour Pressure: NA

Vapour Density: NA

Appearance & Odour: dark brown, slight odour grease

Solubility in water: insoluble

Melting Point: NA

8. FIRE AND EXPLOSION HAZARDS

Flash Point (COC) °C: 220 for base oil

Flammable Limit % vol in air: LEL:NA ; UEL:NA

EXTINGUISHING MEDIA:

Use water fog, dry chemical or CO_2.   Do not use direct stream of water.   Product will float and can be reignited on surface water.

SPECIAL FIRE FIGHTING PROCEDURES AND PRECAUTIONS:

Do not enter confined fire space without proper protective equipment including a NIOSH approved self-contained breathing apparatus.   Cool fire exposed container, surrounding equipment and structures with water.

9. REACTIVITY

Stability: Stable

Hazardous polymerization: Will not occur

Conditions and Materials to avoid: Strong oxidizers

Hazardous decomposition product:
NOx, SOx, COx, PbOx and other unidentified oxygenates can be formed during combustion.

10. EMPLOYEE PROTECTION

RESPIRATORY PROTECTION:

A NIOSH approved respiratory protection equipment should be used when vapour or mist concentration exceeds applicable standards.

PROTECTIVE CLOTHING:

Use oil resistant gloves and other clothing as minimize skin contact.

11. ENVIRONMENTAL PROTECTION

SPILL OR LEAK PROCEDURE:

Scoop up excess grease.   Clean area with appropriate cleaner.

WASTE DISPOSAL:

Dispose of in an appropriate disposal facility in compliance with appropriate regulations.

12. SPECIAL PRECAUTIONS

Store in a cool, dry place with adequate ventilation.   Keep away from open flames and high temperature.   Minimize skin contact.   Wash with soap and water before eating, drinking, smoking or using toilet facilities.

Launder contaminated clothing before using.   Discard leather goods if they cannot be decontaminated.   Wash before eating or smoking. Observe good personal hygiene.

The information contained herein is based on the data available to Showa Shell and is believed to be correct.   However, Showa Shell makes no warranty, expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof.   Showa Shell assumes no responsibility for injury from the use of the product described herein.

DATE PREPARED: 7th May, 1990

A-34

SAFETY DATA SHEET SHELL ALVANIA GREASE RA

1. NAME

PRODUCT: SHELL ALVANIA GREASE RA

CHEMICAL NAME: LUBRICATING GREASE

2. PRODUCT/INGREDIENT

	percent	toxicity
SHELL ALVANIA GREASE RA	100	not available
Solvent Refined petroleum		oil mist, TWA ACGIH/OSHA 5 mg/m^3
hydrocarbons	balance	oral LD$_{50}$ > 5 g/kg (rat) estimated dermal LD$_{50}$ > 28 g/kg, TWA 100 mg/m^3
Lithium hydroxystearate		ca 12
Aromatic Amine	1.5	oral LD$_{50}$ 1.6 g/kg (rat)
Sodium Nitrites	0.8	oral LD$_{50}$ 180 mg/kg (rat)

Based upon data available to Showa Shell this product is not hazardous under OSHA HAZARD COMMUNICATION (29 CFR 1910, 1200)

3. HEALTH INFORMATION

ROUTE OF ENTRY:

Eye contact: May be irritating to the eyes.

Skin contact: Prolonged or repeated skin contact may cause skin irritation.

Inhalation: No specific information.

Ingestion: No specific information.

SIGNS AND SYMPTOMS:

Irritation as above.

AGGRAVATED MEDICAL CONDITIONS:

Pre-existing skin disorder may be aggravated by exposure to this product.

OTHER HEALTH EFFECTS:

This specific product has not been tested in long-term chronic exposure tests.   The handling procedures and safety precautions in this MSDS should be followed to minimize employee' exposure.

4. OCCUPATIONAL EXPOSURE LIMITS

	OSHA		ACGIH		OTHER
	PEL/TWA	PEL/CEILING	TLV/TWA	TLV/STEL	

No OSHA/PEL or ACGIH/TLV has been established.

5. EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT:

Flush with water for 15 minutes while holding eyelids open. Get medical attention.

SKIN CONTACT:

Remove contaminated clothing and wipe excess off. Wash with soap and water or waterless hand cleaner followed by soap and water. Do not re-use clothing until thoroughly cleaned. If irritation persists, get medical attention promptly to prevent serious damage; do not wait for symptoms to develop.

INHALATION:

Remove victim to fresh air and provide oxygen if breathing is difficult. Get medical attention.

INGESTION: Get medical attention.

6. SUPPLEMENTAL INFORMATION

Not identified.

7. PHYSICAL DATA

Boiling Point °C: NA
Specific Gravity: NA
Vapour Pressure: NA
Vapour Density: NA
Appearance & Odour: Amber color, slight odour grease
Solubility in water: Insoluble
Melting Point: NA

8. FIRE AND EXPLOSION HAZARDS

Flash Point (COC) °C: 220 for base oil

Flammable Limit % vol in air: LEL:NA ; UEL:NA

EXTINGUISHING MEDIA:

Use water fog, dry chemical or CO_2.   Do not use direct stream of water.   Product will float and can be reignited on surface water.

SPECIAL FIRE FIGHTING PROCEDURES AND PRECAUTIONS:

Do not enter confined fire space without proper protective equipment including a NIOSH approved self-contained breathing apparatus.   Cool fire exposed container, surrounding equipment and structures with water.

9. REACTIVITY

Stability: Stable

Hazardous polymerization: Will not occur

Conditions and materials to avoid: Strong oxidizers

Hazardous decomposition product:
NOx, SOx, COx, and other unidentified oxygenates can be formed during combustion.

10. EMPLOYEE PROTECTION

RESPIRATORY PROTECTION:

A NIOSH approved respiratory protection equipment should be used when vapour or mist concentration exceeds applicable standards.

PROTECTIVE CLOTHING:

Use oil resistant gloves and other clothing as minimize skin contact.

11. ENVIRONMENTAL PROTECTION

SPILL OR LEAK PROCEDURE:

Scoop up excess grease.   Clean area with appropriate cleaner.

WASTE DISPOSAL:

Dispose of in an appropriate disposal facility in compliance with appropriate regulations.

12. SPECIAL PRECAUTIONS

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Launder contaminated clothing before using.   Discard leather goods if they cannot be decontaminated.   Wash before eating or smoking. Observe good personal hygiene.

13. OTHER REGULATORY CONTROL

All components of this product are listed on the EPA/TSCA inventory of chemical substance.

The information contained herein is based on the data available to Showa Shell and is believed to be correct.   However, Showa Shell makes no warranty, expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof.   Showa Shell assumes no responsibility for injury from the use of the product described herein.

DATE PREPARED: 1st June, 1993

MATERIAL SAFETY DATA SHEET

SECTION I

PRODUCT NAME OR NUMBER (as it appears on label) :
TANOI SHINCOOL 99X-SUPER

MANUFACTURER'S NAME   SHINCOOL COMPANY LIMITED

ADDRESS   89 NAKASHITA, NARUMI-CHO, MIDORI-KU, NAGOYA 458, JAPAN

HAZARDOUS MATERIAL DESCRIPTION, PROPER SHIPPING NAME, HAZARD CLASS, HAZARD ID NO.
    NON HAZARDOUS

ADDITIONAL HAZARD CLASSES (as applicable) :   N.A.

CHEMICAL FAMILY: Mixture with sulforised mineral and lard oils, alcoholes, and
    mineral oil.

FORMULA : It can't be disclosed.

COMMON CODE	EMERGENCY TELEPHONE NO. 052-623-5667 / JAPAN	MANUFACTURER' D-U-N-S NO.

SECTION II — INGREDIENTS
(list all ingredients)

CAS REGISTRY NO.	% W	% V	CHEMICAL NAMES	Listed as a Carcinogen in NTP, IARC or OSHA 19108(s)(specify)
	% W. But not exact percentages			
8001-78-3	10-20		Triacyl glycerin	N.A.
67762-55-4	2-10		Sulforised mineral oil	N.A.
61790-49-6	10-20		Sulforised lard oil	N.A.
64742-65-0	60-80		Mineral oil	N.A.
8001-79-4	20-30		Alkyl polyester	N.A.
13539-13-4	1-5		Thiazole	N.A.

SECTION III — PHYSICAL DATA

BOILING POINT _____ F _250_ C UNAPPLICABLE	SPECIFIC GRAVITY($H_2O=1$)	0.910
VAPOR PRESSURE : UNAPPLICABLE _____ F _20_ C ☐mm Hg ☐psi	PERCENT VOLATILE BY VOLUME(%)	< 0.1
VAPOR DENSITY (AIR=1) < 1.0	PERCENT SOLID BY WEIGHT(%)	100
	EVAPORATION RATE(H_2O =1)	< 1.0
SOLUBILITY IN WATER In-soluble	pH =	N.A.

APPEARANCE AND ODOR:
    Lightly brown color, Sulfureous odor

IS MATERIAL: (LIQUID) SOLID
    GAS   PASTE   POWDER

SECTION Ⅳ — FIRE & EXPLOSION HAZARD DATA

FLASH POINT F 160 C	Method used C.O.C.	FLAMMABLE LIMITS	LEL Not det.	UEL Not det.

EXTINGUISHING MEDIA : CO₂ , FOAM, DRY CHEMICAL EXTINGUISHER

SPECIAL FIRE FIGHTING PROCEDURES : Firefighters should use protective clothing
and self contained breathing apparatus

UNUSUAL FIRE AND EXPLOSION HAZARDS : None

SECTION Ⅴ — HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE —— Conditions to avoid : None known

THRESHOLD LIMIT VALUE N.A.	PERMISSIBLE EXPOSURE LIMIT N.A.	OTHER LIMIT N.A.

PRIMARY ROUTES OF ENTRY: Inhalation☐ Skin contact ☐ Other(specify)

EMERGENCY AND FIRST AID PROCEDURES: Eyes: Wash with plenty water. Seek medical
Attention. Skin: Wash with soap and water. If irritation persists, seek
medical attention.

SECTION Ⅵ — REACTIVITY DATA

STABILITY	UNSTABLE STABLE		CONDITIONS TO AVOID: N.A.

INCOMPATIBILITY(materials to avoid): Strong acid, alkali and oxidizing materials

HAZARDOUS DECOMPOSITION PRODUCTS: No data

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID: N.A.
	WILL NOT OCCUR		

SECTION Ⅶ — SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
Contain spill. Remove to salvage container.

WASTE DISPOSAL METHOD:
Treat as oily waste as government regulations permit.

CERCLA(Superfund)REPORTABLE QUANTITY(in lbs):   N.A.

RCRA HAZARDOUS WASTE NO. (40 CFR 261.33)   N.A.

VOLATILE ORGANIC COMPOUND(VOC)(as packaged, minus water) : N.A.

| ☐ Theoretical _____ lb gal
N.A. | ☐ Analytical _____ lb gal
N.A. |

SECTION Ⅷ — SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION(specify type) : Not required

VENTILATION	LOCAL EXHAUST(Specify Rate) : Not required MECHANICAL (General)(Specify Rate) Not required	SPECIAL : Not required OTHER : Not required
PROTECTIVE GLOVES(specify type) : Rubber gloves	EYE PROTECTION(specify type) : Safety goggles	

OTHER PROTECTIVE EQUIPMENT: Not required in normal use

SECTION Ⅸ — SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Keep it well closed and in cool
place. Avoid extreme heat. Store away from heat sources.

OTHER PRECAUTIONS: Avoid direct fire and sunlight

PLEASE COMPLETE QUESTIONNAIRE AND RETURN TO:	NAME(print) SHINNOSUKE YAMAGUCHI
	Signature *S. Yamaguchi*
	Title PRESIDENT
	Date